Family structure and academic performance of students in secondary schools in the Kingdom of Tonga.

A thesis submitted in partial fulfilment of the requirements for the Degree

of Master of Science in Statistics

by

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Preface

The finding of this study confirmed what I have seen and experience. Thinking back to my time working in secondary schools, has made me testify to this study, that the foundation my parents built my life upon was strong and bold enough to make the person I am today. It was very rich foundation of love, kindness and care. My parents have very strong Christian faith in GOD, their Christ-honouring values together with the *"Faa'i kavei koula"* had a great influence on me and I ended up accepting JESUS CHRIST to my life as my LORD when I was 15 years old. My relationship with the LORD has had a strong influence on my wellbeing in all facets of my life including my academic achievements. It is my main source of guidelines for discipline; for example, the 4th commands in the 10 commandments stated; *"Honour your father and mother, as the LORD your GOD commanded you. Then you will live a long, full life in the land the LORD your GOD is giving you*" (Deuteronomy 5: 16). Obeying and respecting my parents was my main task and being successful at school is one of their many wishes for me. With the strong love and respect that I have for them, it was a very strong force that motivated me to do my best at school to make them happy.

My father (now 84 years old) has very high expectations of me, this study made me realized that he did notice my potential and that is the reason why he has that towering expectation. My parents would be at any functions at school, giving all their supports. At home, they would always make sure that I completed all my homework and all projects, giving me enough time and space to do my study. In 1995, my father leased his piece of land to send me to University for my first degree. He left for the United States to work for my tuition fees for 3 years leaving my mother at home with the rest of my siblings. Before I went to University, I remembered very well, he challenged me to a competition to see who would first throw in the towel – either me with my studies, or him paying for everything. In my life with all that was involved and the commitments between me and my parents including the loving, warm and enriching relationship has accelerated my love for them and empowered me to fulfil their wish. Even up, 46 years old, married with a three years old daughter, my father keep on reminding me of his one last wish, to reach the apex (study for my PhD).

Acknowledgement

First of all, I would like to thank and acknowledge the Almighty GOD for the assistance of thy Holy Spirit by giving me the faith, strength and courage not to give up even though there were times I was about to throw in the towel. Additionally, with very grateful heart I thank HIM for the wisdom that enabled me to fulfil this academic goal.

I would like to acknowledge, thank and salute Professor Jennifer Brown, my chief supervisor who has been with me all the way of my journey and always make time for me whenever I needed assistance and guidance. A special thank is extended to Dr. Jackie Henderson who also contributed to my understanding and most significantly, my confident.

I would like to acknowledge the directors of the education systems in Tonga who granted the permission for me to conduct my study using students of their schools. Rev. Dr. Mele'ana Puloka of Free Wesleyan Church; Mr. Savelio 'Atuekaho of The Free church of Tonga; Mr. Soane Vahe of the Catholic Church; and Mr. Cluade Tupou of the Government. Also would like to extend a special thank, to all the principals and deputy principals of all the secondary schools for making all the data available and assisting in the preparation of interviewing of the students: Mr. Paula Fonua, Mr. Sitani Paulo, Mrs. Mele Taulanga, Mrs. Mele Fehi Fifita, Mrs Taisia Ma'u, and Mr. Mo'unga Maka. And finally a big "malo 'aupito" (thank you so much) to all the participant students and your parents. I could not have completed this research without your willingly contribution by giving the consent to use your data.

I would like to acknowledge my darling husband, Tevita Roger Page Kalafitoni Latu for continually supporting me in anything that I wanted to try and were always have time to offer advice and words of encouragement whenever I needed it. Similarly, I would like to thank my father Simione Latu Leo and all my families for all their support, financially and in prayers which I needed the most. A special thank to my mom's younger sister Mele Hila'atu Latu Leo for helping my husband by volunteering to baby sit our 3 years old daughter, 'Atelaite Moimoi Latu. I would also like to acknowledge my niece Megumi Yatagai Pulu and her husband and my cousin Helen Peviloni Moala and her husband for providing accommodation for me since 2016.

I would like to acknowledge my friends, Mrs. 'Amelia Nightingale Folaumahina, Mrs. Lu'isa Fainga Mahe, Mrs. Kilimana Mosa'ati Fusitu'a, Ms. Keasi Prescott and Rev. Penisimani Tonga for all your kind assistance and with prayers and fasting from the family of faith.

I would like to acknowledge the Government of Tonga for the financial support in granting the scholarship with the opportunity for further studies without it I will not have the chance to do this research. I would also like to acknowledge the Minister of Education in Tonga, Honourable Penisimani Fifita and the Ministry of Education for granting the permission for a study leave allowing me to leave work and seek for more wisdom and experience which will help in the development of education in Tonga.

Abstract

This research examines how Tongan family structure affects the academic performance of students at the secondary level of education. It is a comparative study with the aim of examining whether there is a significant difference between the academic performance of students raised in a traditional family and those students who were raised in a non-traditional family. A Tongan traditional family is defined as comprising two biological parents (or adoptive parents from birth), one male and one female. In contrast as non-traditional family may be a single parent family (including by birth (solo-mother), divorce or death), or the student has no parent present (for example they are staying with relatives or friends). In this study I am looking at what are the key drivers of success and trying to understand the relationship between academic performance and family structure. I hope that empirical evidence will assist the Tongan school administrators, other educators and parents to adopt the best practices and actions for their students' academic achievement. The target population for the current study is the secondary school students, age 13 to 18 years in Tonga in the main island of Tonga-Tongatapu which has 13 secondary schools. Two secondary schools are government schools and the others are private schools run by different religions. From May 23rd to 2nd of August 2017, I surveyed 360 students, 60 from each of 6 selected secondary schools. Unfortunately two schools had to be excluded from the analysis. The results presented here are of 4 schools with 240 participants. This is the first study to be conducted in Tonga. Students' performance scores on the internal assessments of each school were assessed using multiple linear regression and an ensemble of different model selection methods. Findings indicated that students' family structure has a significant effect on their academic performance. The study has identified that the most key drivers for academic success are, in order of importance, school, parental involvement, family structure, age, family expectation and family religious status.

Keywords: Family structure, stratification, academic performance, parental involvement

CHAPTER ONE: INTRODUCTION

GOD is Love. "*Love is patient and kind. Love is not jealous or boastful or proud or rude. It does not demand its own way. It is not irritable, and it keeps no record of being wronged. It does not rejoice about injustice but rejoices whenever the truth wins out"*

(1Corinthians 13: 4 – 6: New Living Translation)

The family is the fundamental and most vital factor in the development, behaviour, and well-being of a child (Mahalihali, 2004 , da Figueiredo & Valadão, 2012). The family is often the first school and first domestic church for a child. That is where the child learns his/her values, behaviours and language. Education begins at home and parents are the first teachers that interact with the child, and the children are always watching and learning from their parents. The child grows up and will often imitate their parents and will continue to do so throughout their schooling. When a child is in school they will continue what they have learnt from home and parents can be considered a builder laying a solid and sure foundation for the life of a child.

A building with a sure foundation is the one which is build on solid rock. "*Though the rain comes in torrents and the floodwaters rise and the winds beat against that house, it won't collapse because it is built on bedrock"* (Mathew 7: 24 & 25: New Living Translation). When the foundation is built well it can carry the weight of anything that it is designed to hold. For the young generations to weather the storms of life, to be successful in all facets of life and to survive all adversities, the keystone of their life must be built on solid rock. The development of a child into a mature and stable citizen of a society starts at home.

At a community level, a child's successful academic achievement will contribute to the accumulation of wisdom that "*will be an enriching ornament and a guide to the development and prosperity of a nation"*(Ritenbaugh, 1997). In almost all countries it is a common practice to examine and monitor the academic performance of the students. For example, the United States of America spent $634 billion on education alone for public elementary and secondary schools in 2013 – 2014 (U.S Department of Education, 2017). In Tonga an important saying is: **"** *He ko e hakau 'o e 'aho ni ko e fonua ia 'o e kaha'u***"** which means, "*The reef of today will be the island of tomorrow*". In English this translation means that the children of today will be the nation of the tomorrow. As such to have a future prosperous and stable society, the reef of today, our children must be well looked after; be prepared and trained to cope with any

adversities and must have true wisdom. We Tongans have our own way of raising our children. The older generation believes that wisdom of Tongans are founded in the *"kainga"* (extended family) because the *"kainga"* define who we are. Younger generations are nurtured by Christian and culture values and norms of behaviour. They are raised up with an emphasized on love, respect, obedience, loyalty, commitment and humility as the standard for life. *"Poto"* (wisdom) to the Tongans is not just the academic success or knowledge alone but only part of it. Wisdom means to the Tongan as *"Poto Fakapotopoto"* which means: know and fulfil all your responsibilities to the family, church and community as a whole; know your position (rank); know the language (Tongan special language) to use; know your cultures values and Christian values.

As according to James, one of the apostles of JESUS CHRIST; "*But the wisdom from above is first of all pure. It is also peace and loving, gentle at all times, and willing to yield to others. It is full of mercy and good deeds. It shows no favouritism and is always sincere"*

(James 3: 17 – New Living Translation).

1.1 Statement of the problem

Secondary school students' academic performance in Tonga is a very political issue and since 2015 is becoming increasingly so. As such, the former Minister of Education and Training (MET) in Tonga, now the current Prime Minister has previously claimed that secondary school students' academic performance is trending downhill (Pireport.org, 2016). His view was that this was a fault of using standardization of marks and as a consequence, changes were made to the system and student achievement in Tonga employed the use of raw marks and standardization of student test scores was abandoned. Additionally, the Ministry introduced in March, 2015 the used of SOLO Taxonomy into the education systems. SOLO stands for Structure of Observing Learning Outcomes and "*it is a means of classifying learning outcomes in terms of their complexity, enabling educators to assess students' work in terms of its quality not of how many bits of this and of that they have got right" (Biggs,J & Tang,C, 2007)*. There was considerable debate among educators, including some in the private education system, in Tonga was about whether it was too early to establish SOLO. Concerns were that the re-writing of the syllabus was not ready; and there was inadequate teacher training to prepare the teachers for this change. These concerns were discussed in the media which, in Tonga, is the

radio communications where topics are aired and everybody can give their opinions. Some of the parents' reactions in the media were to place blame on the teachers on poor academic performance of their children. Despite this attention, in 2016 Tongan secondary school children recorded the poorest academic outcomes for the Tonga National Examinations –Tonga School Certificate (TSC), Tonga Senior School Certificate (TSSC) Tonga National Form Seven Certificate (TNFSC) (Matangi Tonga, 2017). Clearly systematic research was necessary to help educationalists understand and identify potential reasons for poor academic achievement. Evidence based research was necessary to help guide and plan effective learning environment.

In view of this ongoing debate I embarked on this study. I was particularly interested in the role of the family in education outcomes. Across the world it has been identified that family structure (number of parents in a family who raise the children) as one of the major risk factors of academic achievement. According to Coleman's (1960) report *"family circumstances a child came from had a far greater impact on that child's academic achievement than the quality of the child's school"*. My hope is that the results of the study will assist in a better understanding of the association between the type of family structure and academic performance of Tongan secondary school students between the 13 to 18 years of age in Tonga.

1.2 Purpose of the Study

This study is the first of its kind in Tonga. The primary purpose of this study was to examine the relationship between family structure and academic performance of students in secondary schools in Tongatapu, the main island of Tonga. Family structure is classified into two categories in the current study as traditional and non-traditional. A Tongan traditional family is defined as comprising two biological parents (or adoptive parents from birth), one male and one female and non-traditional family may be a single parent family (including by birth (solo-mother), divorce or death), or the student has no parent present (for example they are staying with relatives or friends). Another focus of this study is to identify all the key family-drivers of students' academic performances in secondary schools.

1.3 Significance of the Study

As in a quote, *"Don't judge a situation that you've never been in"* (Mitchell Perry). That is, if you judge something that you do not understand, you cannot be able to give a justice judgement. The topic is worthy of examination because the Ministry of Education and Training (MET) in Tonga needs evidence-based information about students academic performance at school. It is important to identify the key drivers of students' academic performance so that educators can take specific and focused actions to minimize academic performance gaps. This study will provide valuable information, and it is timely and relevant.

The findings of this study will have positive implications for schools' administrators, educators, parents and students. The findings will assist administrators and educators to outline and design effective instructional and support strategies aimed at assisting students' achieving academic success. In addition, I hope the study results will help parents to decide on the best actions and practices to help them motivate their children to work effectively, perform and achieve to the best of their capability. In order to plan and implement effective practices for students' academic achievement, it is important to identify both the problem and the predictor variables. As in the saying; *"You can't apply the medicine until you know where the wound is"* (Tyndale, 2013). After this it may then be possible for the optimal use of time and resources to design the best intervention strategies (Fonteboa, 2012)

It is also of critical importance to disseminate the results of the current study with the community and the current Government of Tonga. The results of this study have the potential to change the way education is viewed in Tonga. New knowledge and an understanding of the significant relationship between family structure and academic performance will lead to a change in attitude. My own personal hope is that there will not be any unnecessary nor unjustified blame on the students, their families, the community and the educational sector in Tonga. Rather everyone involved in the learning communities will realize their own vital role in the children's academic outcome. The results have the potential to inform the Government of the Kingdom of Tonga so they can respond appropriately channelling support to where there is the greatest need.

1.4 What is already known?

A large number of empirical studies have demonstrated that the family structure is one of the key variables associated with children's academic performance (Hampden-Thomson, 2009; Astone and McLanahan, 1991; Bolu-Steve and Sanni, 2013; Kraydal, 2009). The majority of studies, however, studies have been conducted in the United States of America and may not generalise to the Tongan culture. Studies have found that an achievement gap exists between children growing up in traditional families and in non-traditional families (McLanahan & Sandefur, 1994; Del Angel-Castillo & Torres-Herrera, 2008; Hampden-Thomson, 2009; Yara & Tunde-Yara, 2010). In a comparable analysis of 11 countries 9 countries reported achievement gaps: with an exception Australia and Iceland who consistently demonstrated insignificant achievement gaps (Pong et al, 2003). Here I have separated countries into two groups; significant and non-significant academic performance difference between students from single-parent families and students from two-parent families. This review examines investigations conducted across different countries: United States of America, Africa, Europe, and Asia and the association between family structure and students' academic performance.

From the United States of America; last year, Egalite (2016) highlighted in her summary article on Coleman's 737-pages report in 1966, that the study unveiled that family and its structure explained more of a child's academic achievement than did school resources. Coleman's finding indicated that a family's role in their child's learning and academic achievement may have more influence than the schools with the highest academic standards or the wealthiest. This role of the family in their child's academic development led many scholars to investigate further the same issue internationally. In their study Astone and McLanahan (1991) reported that there were differences in educational attainment gaps between students from families where the children were with their two birth parents, and children from other family structures. They attributed this finding to how parental involvement influenced children's school achievement positively. They described a situation where an adolescence grew up in single-parent or in a step- family and received less encouragement, and had less help with school work than the comparison adolescent with both natural parents. The authors concluded that differences in parental behaviour accounted for the academic performance gap between children from single-parent families and those from two-parent families. Mclanahan and Sandefur (1994) also reported similar findings in their study, they also

found that students from two-parent households performed academically better than students from single-parent households.

In 2010, Yara and Tunde-Yara reported from Nigeria, West Africa about the educational achievement differences between students from single-parent families and those from two-parent families found by their study. A similar finding was reported by Bolu-Steve and Sanni in 2013. Their results showed significant gap on students' educational achievement based on family structure. More recently, authors of a study conducted in Nigeria reported the same finding as Olaitan (2017). In addition the Kenyan study, Nato (2016) findings revealed that nuclear family background had positive significant impact on the academic performance compared with a single parent family background. He emphasized that the positive impact of nuclear family was due to *"economic support, family support, parental motivation and home study environment"*.

In Europe Steel, Sigle-Rushton and Kraydal (2009) conducted a study examining the relationship between family disturbance and children's education outcome in Norway. Surprisingly, that even in a *"country with very high economic equality"*, there was significant gap in school achievement between children who are living with both biological parents and those with one of the parents. Even after controlling with *"time-invariant unobserved predictors"*, the significance of the achievement differences remained. A report from Romania (Hatos & Sergiu, 2013) also reported similar results highlighting the crucial relationships within the family, especially child-parents interactions, and their effect on a child's learning outcomes. The results suggested that non-intact family structure negatively influenced the educational performance with respect to; *"quality and quantity of parental involvement; structural deficiencies; adjustment problems; decline in material resources"*. These outcomes were attributed mainly to disruption of family structure which is "absence of natural parents".

Finally a recent study conducted in Japan, Asia, Nonoyama-Tarumi (2017) reported that children who were raised up in two-parent families performed academically higher than those of single-mother and single-father families. A key study finding was that more than 50% of low academic attainment in single-mother families was explained by insufficient economic resources, whereas disadvantage in academic outcome of children raised by single-father families was explained by very low parental involvement *"like discussion at home, supervision at home, involvement at school, than economic resources"*. Nonoyama-Tarumi implied that the apparent differences in achievement between children from single-parent and those from two-

parents in Japan could be the consequences of *"gendered labour force and division of labour among spouses in Japanese society"*. Regardless of the wealth of literature supporting the existence of educational achievement differences between students from one parent families and those from two-parent families, in contrast a finding from a study conducted in Hong Kong by Chiu and Ho (2006) indicated that the academic performance between children in either of the two family structures were not significantly different. They conducted a study on 15 years old students and academic performance was measured using "reading, mathematics and science scores". Study results showed no significant difference between students from single-parent families and those students from families of two-parent, and difference can be disappeared by adjusting for parental involvement and SES. Their explanations are; difference in culture, equal school funding policies for students, *"higher socioeconomic standings of single parents"* and the very strong family ties in Hong Kong. In 2016, Cheung and Park findings show a consistent result with Chiu and Ho for single motherhoods. However, with single fatherhoods a significant academic gap was found.

This current study examines the relationship between family structure and academic performance of students in secondary schools between the ages of 13 to 18 years in the Kingdom of Tonga. Following a review of the relevant literature, I also focussed on parental involvement and socio-economic status (SES) as they appeared as salient factors in explaining the relationship between families and academic achievements. Other factors I reviewed included family expectations, Christianity faith in GOD (religious status), time spent at home to study and demographics (school, age and gender).

1.5 The Kingdom of Tonga Context

For readers who are not sure where Tonga is and less familiar with the kingdom of Tonga, I present a brief description here.

1.5.1 Where in the world is the Kingdom of Tonga?

Tonga, a small island developing state, officially "*Pule'anga faka-Tu'i"(*Kingdom of Tonga) is located in the southern hemisphere, in the southern region of the Pacific Ocean as shown in ***Figure 1.5.1a*** below. It is a western Polynesian sovereign state that *"consists of 177 small islands, 45 inhabited, which are scattered between 15 and 23 degrees latitude south and 173 and 177 longitude west(World Atlas). It covers 717 square kilometres of land and 30 square kilometres of water"* with a population of 100, 745 (Statistics Tonga 2016 census). Tonga is made up of 3 main clusters of islands as shown in ***Figure 1.5.1b*** and the capital city, Nuku'alofa is on the Tongatapu group.

Tonga is a nation that respecting the family is one of its essential values. It is a society entwined with Christianity which has been a vital and influential aspect of every Tongan's life. It still retains its uniqueness as the only monarchy in Polynesia and the only Pacific Island that never being colonised or *"loses its native governance"*. Tongan and English are officially the common languages used in Tonga.

Figure 1.5.1a: Part of the World Mark with the location of Tonga

Source: Whereig.com; http://www.whereig.com/au-oceania/where-is-tonga.html

Figure 1.5.1b: Map of Tonga

Source: Worldatlas.com , http://www.worldatlas.com/webimage/countrys/oceania/to.htm

1.5.2 Family structure in Tonga

"Ko e 'OTUA mo Tonga ko ia hoku Tofi'a" (GOD and Tonga are my inheritance) is the motto of the nation. Fefaka'apa'apa'aki (communal respect), tauhi va (nurturing relationship, loyalty), lototō (humility) and mamahi'i me'a (commitment) are the main cornerstones known as *"Faa'i Kavei Koula"* (four golden themes) of the structure of the Tongan society. These *"Faa'i Kavei Koula"* are also the core values for the structure of the family in Tonga. All these core values are founded in *"Ofa"(*love) which means *"Ofa"* is the foundation stone of the *"Faa'i Kavei Koula".*

As John H. McNaughton composed in his hymn known as "Love at Home" – "*Love becomes a way of Life; Sweet, insistent end of strife; Glad submission each one's gift; Willing pledge to Love and lift; Healing balm for every rift, when there's LOVE at home"*

(McNaugtone,1854).

Tongans are family–oriented people and that is an indication that family is the essential element of Tongan life. Normally, they live in extended families, where members of blood related people live together; for example, adopted children, cousins, uncles, aunties together with siblings and grandparents or great-great grandparents. The father's status has the highest rank in the Tongan nuclear family and each individual has a role to play, for example, the mother's job is to serve and support the husband and care for the children. Tonga is a

communal society. The Tongans are very strongly attached to their religion, culture and traditions. With this lifestyle, divorce and solo-mother (birth out of wedlock) were very uncommon in Tonga, until recently. The divorce crude rate from 1993 – 1999 was 7.93 per 10,000 people and it has since doubled to 16.4 crude rate for year 2010 – 2016 (Tonga Court Statistics - ***Table app2.a Appendix 2***). Though it is still not common, there is an increasing trend, as shown in table ***Table app2.a***. For clarification, these data presented here are for just the divorces that had been filed in court, it could be different picture if divorces that had not been filed in court were included. Additionally, the solo-mother crude rate for 2000 was 24.5 per 10,000 people and 32.4 for 2010, an increase of 7.9 per 10,000 people ***(Table app2.a- refer to Appendix 2***.)

1.5.3 ***Schooling in Tonga***

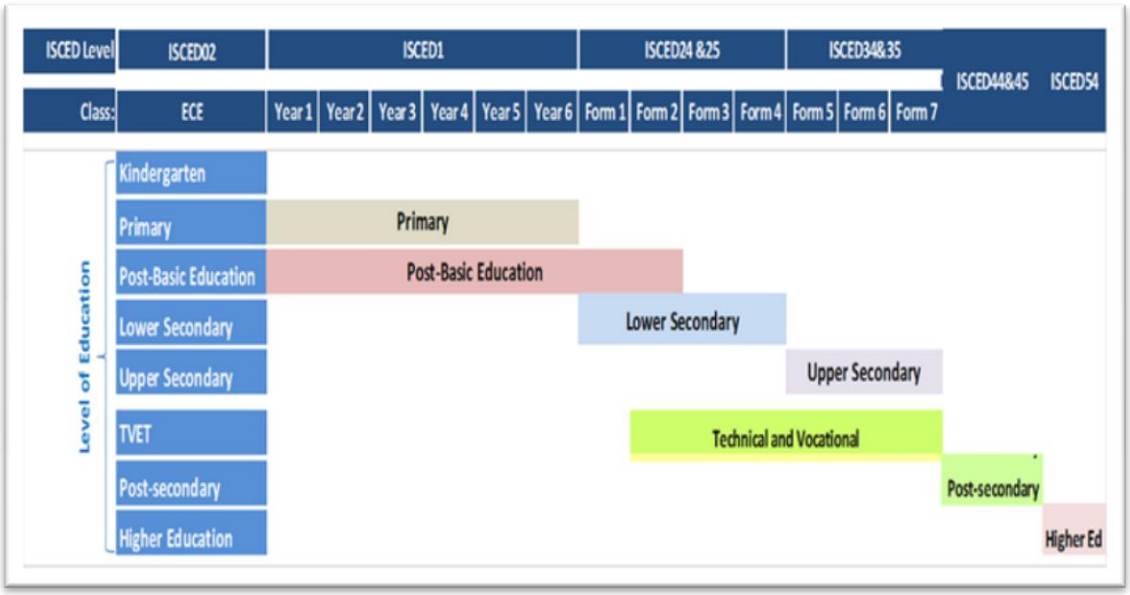
"*The people of Tonga will achieve excellence in education that is unique to Tonga*" is the vision statement of the Ministry of Education and Training (MET) for education in Tonga. This is follow by a mission, "*To provide equitable, accessible, relevant, and sustainable quality education for all Tongans that will enable Tonga to develop and become a learning and knowledge society*". Tongans consider education as the pathway to uplift their standards in every facet of life and effectively contribute to the welfare and development of their communities and society.

Education is free for kindergarten up to post-basic education which is age 4 to 13years. 4 or 5 years old children are eligible to be enrolled into a kindergarten education. Post-Basic education includes primary and basic education level. The age for primary school ranges from 6 to 11 years and whereas the post-basic education age ranges from 6 to 13 years old. Secondary education comprises of two levels, lower and upper (shown by ***Figure1.5.3a***). The age ranges for students in lower secondary is 12 to 15 years old and 16 to 18 years old for those students in the upper secondary.

Primary school is compulsory and at the end of Year 6, students must sit a Secondary Entrance Examination (SEE) to gain entry into Form1 of the secondary education lower level. Form2 students at the Post-Basic education level must sit for the Common Examination at the end of the year to gain entry into Form3 at the secondary education lower level. At the secondary education upper level, students may sit for the Tonga School Certificate examination (TSC) at the end of Form5. They must pass the TSC examination to enter Form6 and at the end

of the year students may sit for the Tonga Senior Secondary Certificate examination (TSSC). Passing this examination and students will gain entry to Form7 and they may sit the Tonga National Form Seven Certificate examination (TNFSC) at the end of the year.

Figure 1.5.3a



Source: Ministry of Education and Training Tonga(Edu.gov.to)

1.6 *Personal Journey*

"For I know the plans I have for you", said the LORD. *"They are plans for good and not for disaster, to give you a future and a hope."*(Jeremiah 29:11: New Living Translation). According to my Christian faith, GOD paves this journey for me, because getting a Master degree is not something I ever imaged for myself. In the middle of a staff meeting in 2014, tears running down my cheeks like a rainfall when the principal informed the teachers of Tonga High School that the deputy principal had won a scholarship award to go aboard for further study, thinking that I already knew, not knowing that it was totally a surprise for me. I had been offered this scholarship to be trained as an educational data analyst for the Ministry of Education and Training (MET) in Tonga. Being an educator for nineteen years in Tonga teaching mathematics and statistics in different high schools travelling from one island group to another (***Figure 1.5.1b***) had driven me along this pathway. During my teaching life, I realized the vital role of the family in the life of a child specifically in the academic performance. One of my purposes in life is to build up others or help those who are in need. I am determined to make a difference by providing evidence to initiate intervention strategies for the improvement of the students' academic performance for the well being of each family and Tonga as a whole.

CHAPTER 2: METHODOLOGY

2.1 Study Design

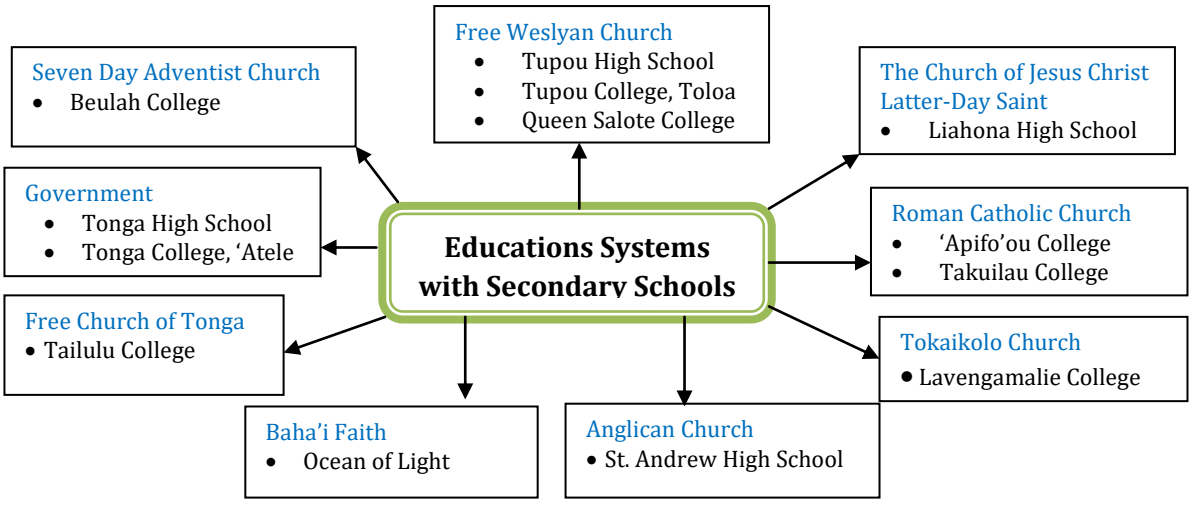
This study characterises school children and their academic performance in Tonga.

2.2 Setting

All participants in this study attended school at Tongatapu, the main island of Tonga. Students were selected from secondary schools run by different education systems. Students were interviewed starting May 23rd through to 2nd of August, 2017. Shown in ***Figure 2.2a*** is the map of Tongatapu marking the location of 12 secondary schools at Tongatapu (one is missing). The selected schools are those that are marked in green colour. Out of the 13 secondary schools in Tongatapu, two are government schools and the others are private schools run by different church groups (***Figure 2.2b***).

Figure 2.2a: Map of Tongatapu indicating the locations of the 13 secondary

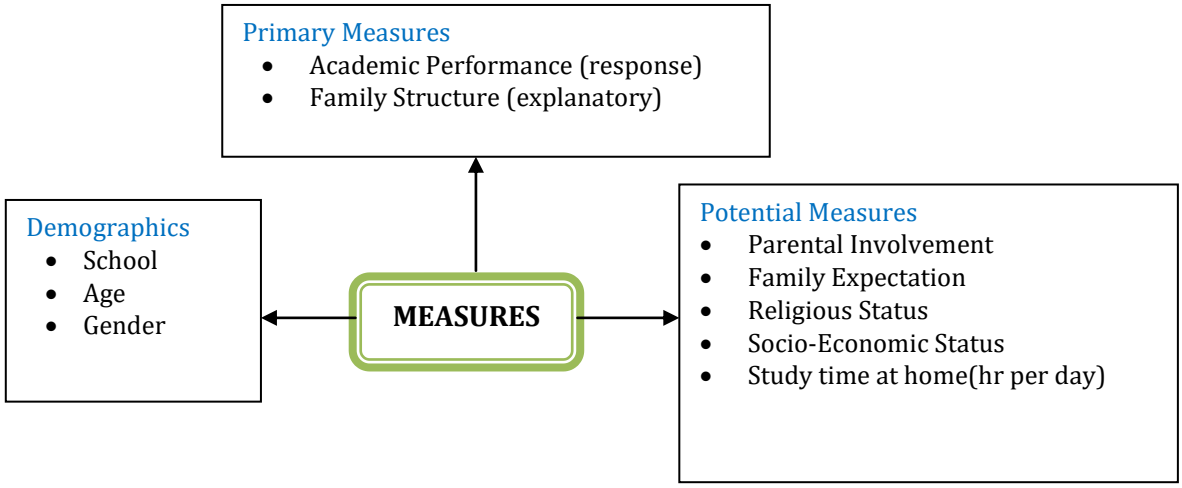
Figure 2.2b: Education systems in Tonga and the 13 secondary schools



2.3 Participants

The study participants were 360 secondary school students, aged 13 up to 18 years, who had internal examination marks in 2016, and who had the consent of their parents and had given their own consent to participate in the study.

2.4 Measures with definitions and coding



Academic Performance: The internal assessments scores for 2016 of each selected school were used to measure academic performance. Some of the schools have two major internal examinations (mid-year and end-of-year) each year. The others have four major examinations, one exam every term. Total scores of students were given in percentages and, since they were from different schools, and each school set their own internal assessments, the scores were converted to standard normal score (z-score). This process was done to ensure validity and reliability. Z-scores measure how many standard deviations an ordinary score (raw score) is below, or above, the population mean. Here the sample mean was used as an estimator for the population mean.

Family Structure: Family structure was categorized into two categories; traditional and non-traditional. A traditional family in this study was a family with two married biological parents (or adoptive married parents from birth), one male and one female. A non-traditional family was for example a single parent family (including by birth (solo mother), divorce or death), or the student who had no parent in their household (for example they are staying with relatives or friends)

Study time at Home: This was an approximate time (hour per day) a student spent at home to study including revising notes but not including time spent on completing homework.

Parents' Socio-Economic Status(SES): This composite score was developed by Dr. Priyanka Sharma (Sharma, 2015) and was adopted to define and code a SES variable. This process used a combination of parents' education, occupation and family main sources of income. I did not have every items used by Sharma, but I used the only information I had and followed the steps explained in the *Appendix 1*– Supplementary materials.

Parental Involvement: This was a composite score derived from students' responses to two liker-type (Vagias, Wade M-2006) items. Each item has 4 anchor points; (i). never, hardly ever, sometimes , often *("How often do your parents' or guardians do each of the following?"*); (ii). strong agree, agree, disagree, strongly disagree (influence of parents attitude on academic performance). I applied the same process used by Sharma (Sharma, 2015) in India for SES, using the set of questions given for parental involvements. Please refer to the Supplementary materials in Appendix 1 for detail.

Family Religious Status: A student was asked to rank the strength of their Christian faith in GOD and the faith of their family. Ranking was from1 to 5 with strong = 1 and 5 = weak.

Family Expectation: Students' expectations and their perception of their parents' expectations on academic achievement were used to determine a family expectation status score. With those that have different expectations from their parents, I chose the one with the highest expectation.

The coding of all the variables (dependent and independent) are shown below in *Table2.4a*

Table 2.4a: **Coding of variables**

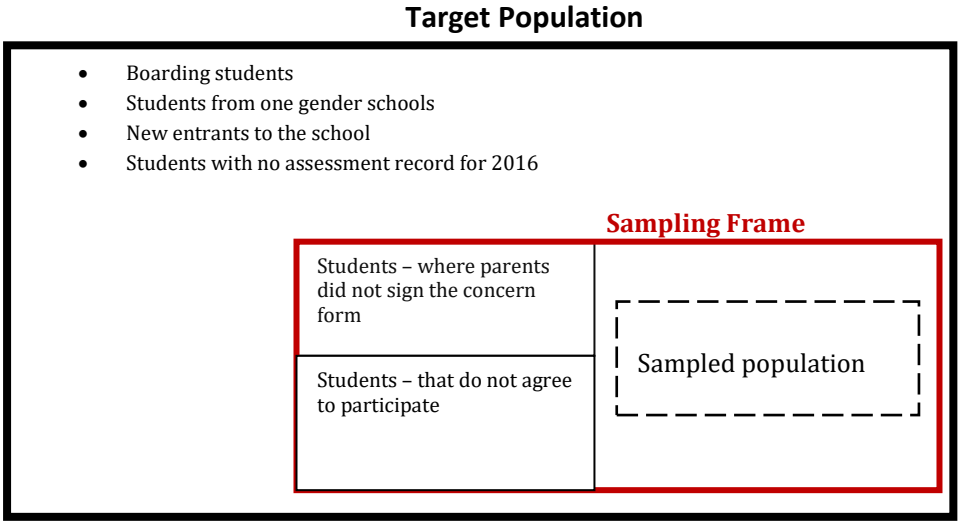
Variables	Coding
Response Variable	
1. Academic Performance	
Internal assessment (Mid-year + End-of-year Examinations = 100%)	Mean = 44.5%, and standard deviation = 15.6%. Scores are converted to standardized score (z – score) – continuous (Linear) Logistic Regression : (1= pass, when z >0 ; 0 = fail, when z < 0) Ordinal Regression: (Excellent = z > 2.55; very good = 1.27 < z ≤ 2.55; good = 0 < z ≤ 1.27; fail -0.29 < z ≤- 0.001; poor = z ≤ -0.29
Independent Variables	
2. Family Structure	1 = non-traditional family ; 0 =traditional family
3. Parental Involvement	2 = High; 1 = Medium ; 0 = Low
4. Family Expectation	2 = High; 1 = Medium ; 0 = Low
5. Family Religious Status	2 = Rank1; 1 = Rank 2; 0 = Rank3+
6. Family Socio-Economic-Status (SES)	2 = High; 1 = Medium ; 0 = Low
7. Study time at home (hour per day)	2 = (0 – 1 hr); 1 = (2 – 3 hrs); 0 = (4 or more hrs)
Demographics	
8. Age (2 years age band)	2 = (13 – 14 years) ; 1 = (15 – 16 years); 0 = (17 – 18 years)
9. Gender (Female or Male)	1 = Male ; 0 = Female
10. School (4 schools)	4 = Sch4; 3 = Sch3 ; 2 = Sch2; 1 = Sch1

2.5 Procedures

2.5.1 Target Population, Sampling Frame and sampled population.

The target population for this study was secondary school students age 13 and 18 in the island of Tongatapu. As shown in ***Figure 2.5.1a*** below, some students from the target population were excluded in the sampling frame. Examples of students not included are boarding students, students from one gender schools, new recruitments to the school and those without any internal assessments records for the year 2016. Within the sampling frame students who did not sign the consent form or their parents were also excluded.

Figure 2.5.1a: Target population and Sampling frame



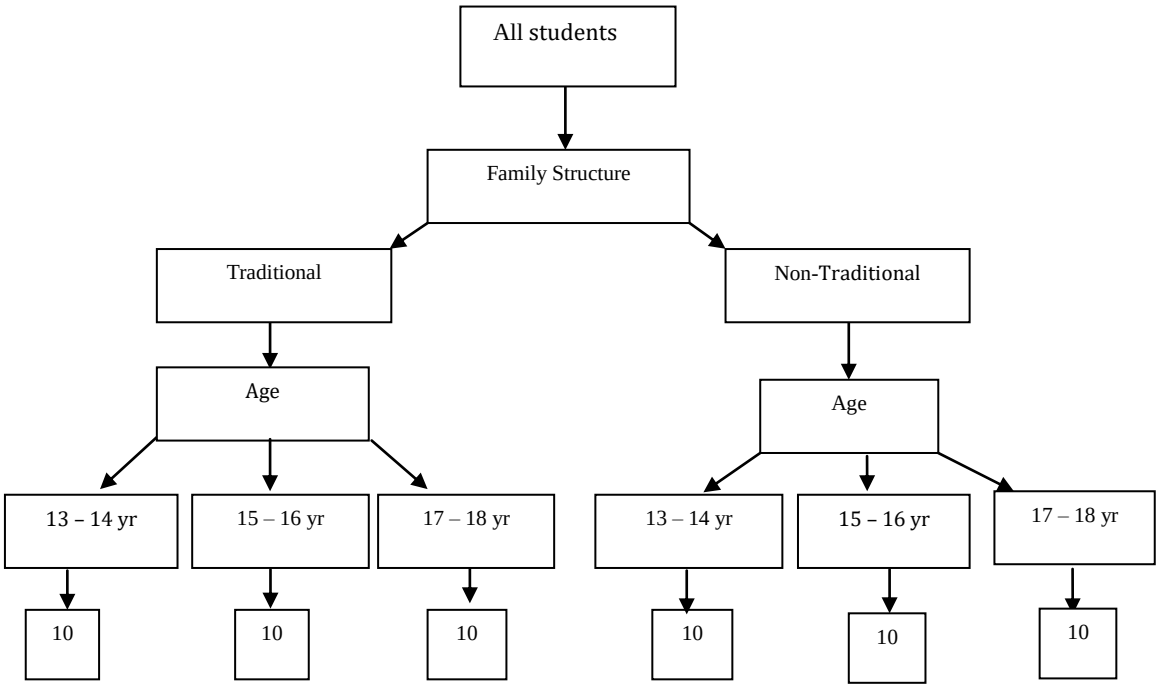
2.5.2 Sampling Method

Cluster sampling was employed to select the schools based on education system. There were nine clusters, as shown in ***Figure2.2b*** and six were selected. One school was picked at random from each selected education system. Sixty (60) students were selected at random from each selected secondary school, and this was balanced to make sure there were thirty from each type of family structure. Students' family structures were identified using the administrative data where family structures of all students were recorded except for two schools. These two schools did not have a record for the students' family structure. For these two schools, forms as shown below were distributed to the target population by the deputy principal to indicate their family structure before selection was done. Therefore, family structures of all students in the target population in each selected school were known before selection of the sample.

Name: .....
Form Class:……
Please tick the appropriate box for the structure that explains your family;
☐ Traditional family
Staying with married ☐ biological parents
☐ adoptive parents
☐ Non -Traditional family
Staying with a single parent by; ☐ birth
☐ divorce
☐ death
OR Staying with ☐ relatives
☐ friends
Others: Please specify:

Flow Chart 1, ***Figure2.5.2a*** demonstrates the selection of participants from each school.

Figure 2.5.2a: **Flow chart 1**

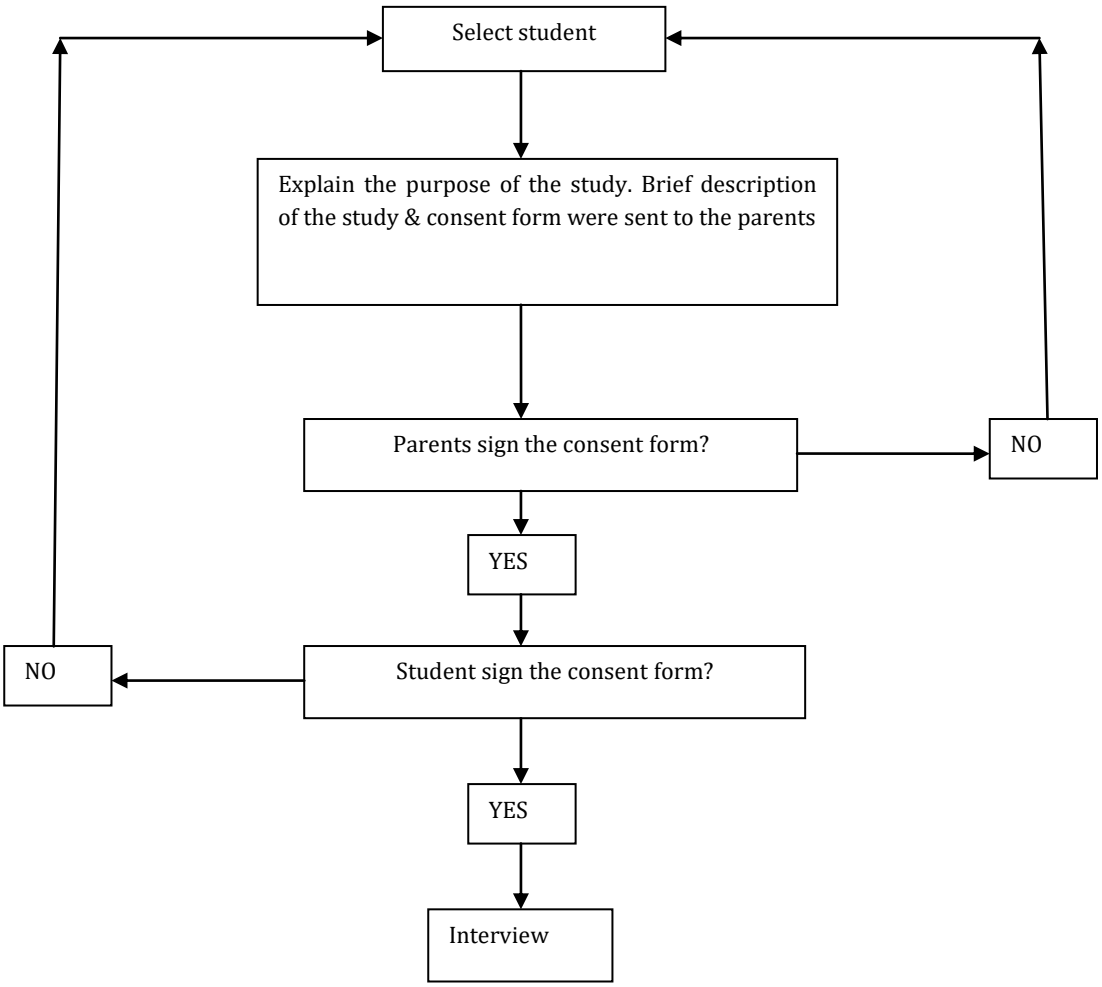


Two stages stratification and simple random selection were used to select participants from each secondary school. The first stage stratification was based on the student's family structure and the second stage was on age. Each family structure category was stratified into three stratum based on age band and ten participants from every stratum were selected using simple random selection without replacement.

2.5.3 Data Collection

This study collected both quantitative and qualitative data through interviews. Some of the data were retrieved from the school's administrative data for example, academic performance, age and, where available, family structure. The internal assessments for 2016 were used as the measure of academic performance for this study. Flow chart2 (***Figure2.5.3a***) given below outlines the process of picking a participant for the interview. Each student was interviewed for at most 10 minutes and was audio recorded.

Figure 2.5.3a : **Flow chart 2**



2.5.4 Statistical Analysis

Descriptive statistics (tables, cross-tabulations, simple percentage and charts) were used to examine the demographic profiles and the potential measures of academic performance. Box plots and density plots were first used to visualize the difference in the means of the academic performance of students from different levels of all the independent variables, for example, traditional and non-traditional families; high, medium, low parental involvement, etc.

Several regression models (Linear Regression, Logistic Regression and Ordinal Logistic Regression) were used to explore the relationship of academic performance with family structure and the other potential variables. Multiple linear regression was the main model of analysis for this study whereas logistic and ordinal logistic regressions were used to confirm the results produced by the linear model.

Univariate models were first produced to look at each predicator variable individually. The final multivariate model was selected using different methods available in the R software packages (version 3.2.3), including the Stepwise backward elimination, Akaike Information Criterion (AIC), Boruta function (boruta package), Mallow's CP Selection, randomForest function (party, randomForest packages), relative importance (relaimpo package) and information values function (devtools, riv and woe packages).

Backward elimination (Cohen & Cohen, 1983) starts with the full model where all the explanatory variables are included. Then, one by one, variables are eliminated based on the residual sum of squares (RSS) with variable with the smallest RSS being deleted. When to stop the elimination process depends on the particular stopping rule. AIC, Akaike Information Criterion (Burnham & Anderson, 2002) is a measurement that compares and ranks different models penalising models that are overly complex. This process is run to estimate and identify the best model for explaining the response variable. Boruta (Kursa & Rudnicki, 2010) is an example of an all-relevant variables selection approach. This method identifies all variables that are relevant and uses a random forest algorithm for final selection. Boruta performs an overall search for relevant variables by calculating the measure of the importance of each variable using Z scores. This score is compared to the random permutations of the variables and irrelevant variables are eliminated at each step. Mallow's CP Selection (Kobayashi & Sakata, 1990) compares the predictive ability of the sub-models to that of the full model. The rule is to select the model with the lowest value of Mallow's CP which is an unbiased estimator of the mean square prediction error (MSPE). Random Forest (Breiman, 2001) builds the best accurate models to explain most of the response and can be used to identify the most important explanatory variables. The method builds a forest of randomized trees where each tree relies on the values of a vector which is sampled randomly and independently. The variable importance is evaluated using a measure which is known as Mean Decrease Impurity (MDI) importance. MDI importance depends only on the significant variables and it is equal to zero if the variable is insignificant. Relative importance (Grömping, 2006) in multiple linear models is computed using various metrics available in the relaimpo package in R, for example metric first, metric last, metric betasq, metric pratt, metric lmg and metric pmvd. These are measures of the contribution of each individual predictor to the full multiple regression model, and operate in different ways by comparing how much each predictor can explain. Information Value (Larsen, 2015 and Shannon, 2001) is a value that measures the capability of a variable in

making a distinction between a binary response (fail or success) in a target variable. It is very useful for screening important predictors for a binary logistic regression by comparing the predictive power among variables. The logic behind this is that the lower the information value the weaker the strength of the variable to classify the target variable.

All analysis was conducted using R version 3.2.3 and Ms.Excel. The significant level for all analysis in this study was 5% (0.05).

2.6 Ethics

Clearance for this study was approved by the Educational Research Human Ethics Committee (ERHEC) of the University of Canterbury in May the 9th, 2017. The Chief Executive Officer (CEO) for the Ministry of Education and Training (MET) in Tonga had granted the permission of this study in the 19th April, 2017 to be conducted in Tonga and we were asked to only include schools that had agreed to participate. We also obtained the approval of the Director for Education from each education system. Participants for this study were students who agreed to participate and where we had with the consent of their parents. All names of students were kept confidential and will not be mentioned in anyway; in the report or any presentation.

CHAPTER THREE: RESULTS & FINDINGS

Out of the 13 secondary schools in Tongatapu, 6 were selected for the study and 360 students participated during the data collection process. However, during transcribing and coding process two schools were excluded from the dataset. One school had used an internal assessment method that measured different outcomes from other schools. Their results were not comparable and their scores were given as a range rather than the exact scores. Therefore for consistency, a decision was made to exclude this school. For the other school, the data was not received in time for the analysis and the principal of this school preferred to do the interview himself. With these schools being excluded we ended up with a sample of 240 participants for this study from four schools.

3.1 Descriptive Data

3.1.1. Demographic of eligible participants overall (n = 240)

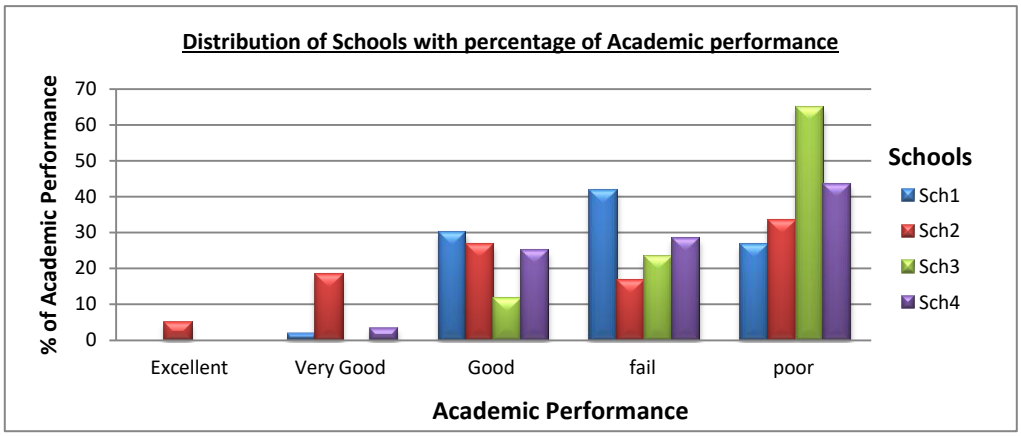
Equal numbers of participants (60) were selected from each chosen school. ***Table3.1.1a*** and ***Graph3.1.1a*** show that in the 2016 internal assessments, most of the poor performers (38.6%) studied at Sch3 whereas Sch2 had the only excellent achievers and the majority had very good achievements (78.6%). Three schools had the most participants on the categories of fail and poor academic performance (Sch1 – 68.4%; Sch3 – 88.3%; Sch4 –71.6%) whereas Sch2 had 50%. As shown clearly in ***Graph3.1.1a*** most of the low (fail and poor) achievers studied at Sch3 and most of the good achievers (good, very good and excellent) were from Sch2. Academic performance was categorized into 5 levels (excellent, very good, good, fail and poor) as shown in ***Table3.1.1a***. The cut off boundaries for each category are the following: Excellent = (85 – 100%); Very good = (66 – 84.49%); Good (45 – 64.49%); Fail = (40 – 44.49%); Poor = (below 40%).

Table 3.1.1a: School Distribution partition with academic performance

School	Total N =240		Excellent (N=3)		Very Good (N=14)		Good (N=56)		Fail (N=66)		Poor (N=101)	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Sch1	60	(25.0)			1	(1.7)	18	(30.0)	25	(41.7)	16	(26.7)
Sch2	60	(25.0)	3	(5.0)	11	(18.3)	16	(26.7)	10	(16.7)	20	(33.3)
Sch3	60	(25.0)					7	(11.7)	14	(23.3)	39	(65.0)
Sch4	60	(25.0)			2	(3.3)	15	(25.0)	17	(28.3)	26	(43.3)

Source: ***Schools Database in Tonga-2016.*** *All blank cells have zero:*

Graph 3.1.1a: **Distribution of Schools with percentage of academic performance**



Age was stratified into three age bands with 80 participants for each level. There were equal numbers (40) of participants from each family structure for each age band. Young and old students had approximately the same number of low achievers = fail + poor academic performance (13 – 14 : 67.5%; 15 – 16: 67.5% ; 17 – 18: 73.8%) while older students (17 – 18 yrs) had the most number of low achievers (73.8%) as shown in ***Table3.1.1b*** and ***Graph 3.1.1b*** given below. ***Table3.1.1b*** and ***Graph 3.1.1b*** also show that younger students did better in their 2016 internal assessments than the older the students.

Table 3.1.1b: **Age band distribution partition with academic performance**

Age	Total N =240		Excellent (N=3)		Very Good (N=14)		Good (N=56)		Fail (N=66)		Poor (N=101)	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Age bands												
13 – 14 years	80	(33.3)	1	(1.3)	6	(7.5)	19	(23.8)	24	(30.0)	30	(37.5)
15 – 16 years	80	(33.3)	2	(2.5)	6	(7.5)	18	(22.5)	20	(25.0)	34	(42.5)
17 – 18 years	80	(33.3)			2	(2.5)	19	(23.8)	22	(27.5)	37	(46.3)

Source*: Schools Database in Tonga, 2016.*

Graph 3.1.1b: **Distribution of Age with percentage of academic performance**

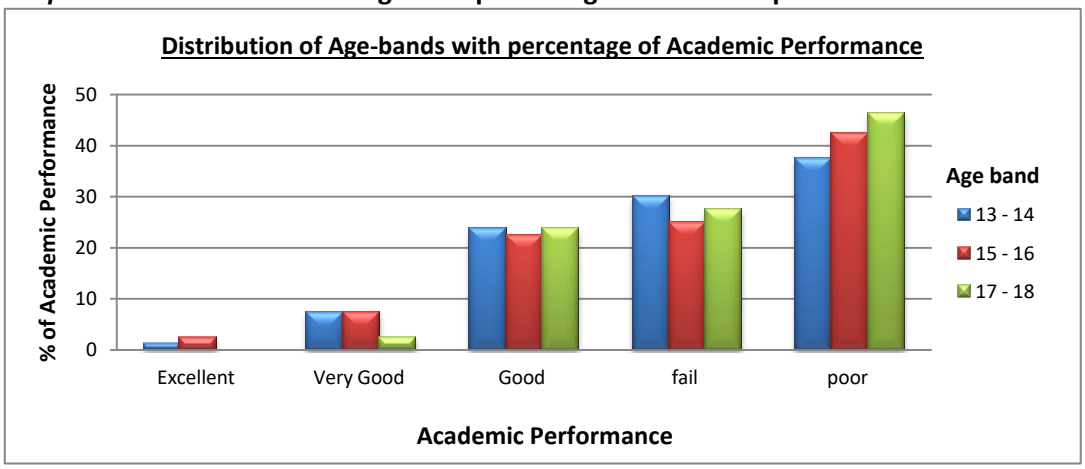


Table3.1.1c shows that higher numbers of participants (63.8%) were females. ***Graph3.1.1c*** shows that majority of both female and male participants have poor academic performance, although females performed better than males. Overall (27.5%) females were good performers whereas only 16.1% of males were. Most male participants (49.4%) had poor academic performance in the internal assessments in 2016 with only 37.9% females being poor performers.

Table 3.1.1c: Gender Distribution partition with academic performance

Gender	Total N =240		Excellent (N=3)		Very Good (N=14)		Good (N=56)		Fail (N=66)		Poor (N=101)	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Female	153	(63.8)	2	(1.3)	9	(5.8)	42	(27.5)	42	(27.5)	58	(37.9)
Male	87	(36.2)	1	(1.2)	5	(5.7)	14	(16.1)	24	(27.6)	43	(49.4)

Source*: Schools Database in Tonga, 2016*

Graph3.1.1c: **Distribution of Gender with % of academic performance**

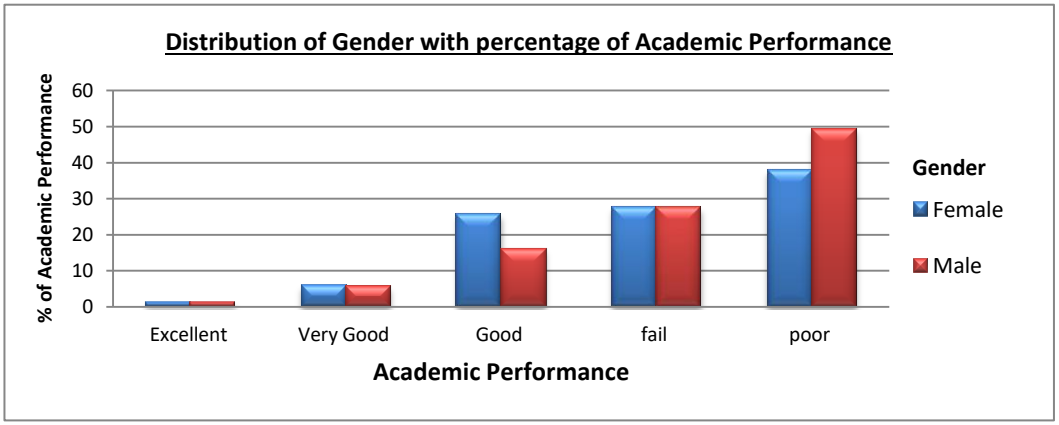


Table 3.1.2a and ***Graph 3.1.2a*** show that the highest numbers of poor performers (61.4%) were students from non-traditional families with 38.6% coming from traditional families, a result that support my belief that students from traditional families perform better than those from non-traditional families. Breaking down non-traditional family structure into subgroups as shown in ***Table 3.1.2b*** and ***Graph 3.1.2b***, for students from divorced families, 60% were poor achievers compared with only 32.5% from traditional families.

Table3.1.2a: Family Structure (two groups) Distribution partition with Academic Performance

Family Structure	Total N =240		Excellent (N=3)		Very Good (N=14)		Good (N=56)		Fail (N=66)		Poor (N=101)	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Traditional	120	(50.0)	2	(1.7)	9	(7.5)	36	(30.0)	34	(28.3)	39	(32.5)
Non-Traditional	120	(50.0)	1	(0.8)	5	(4.2)	20	(26.7)	32	(26.7)	62	(51.7)

Source*: Schools Database in Tonga, 2016*

***Graph3.1.2a* : Distribution of Family structure with % of academic performance**

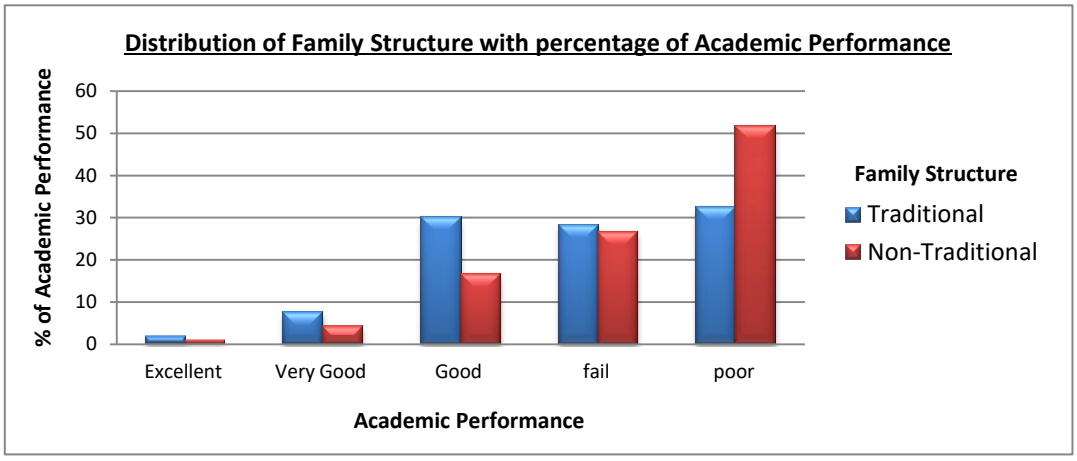
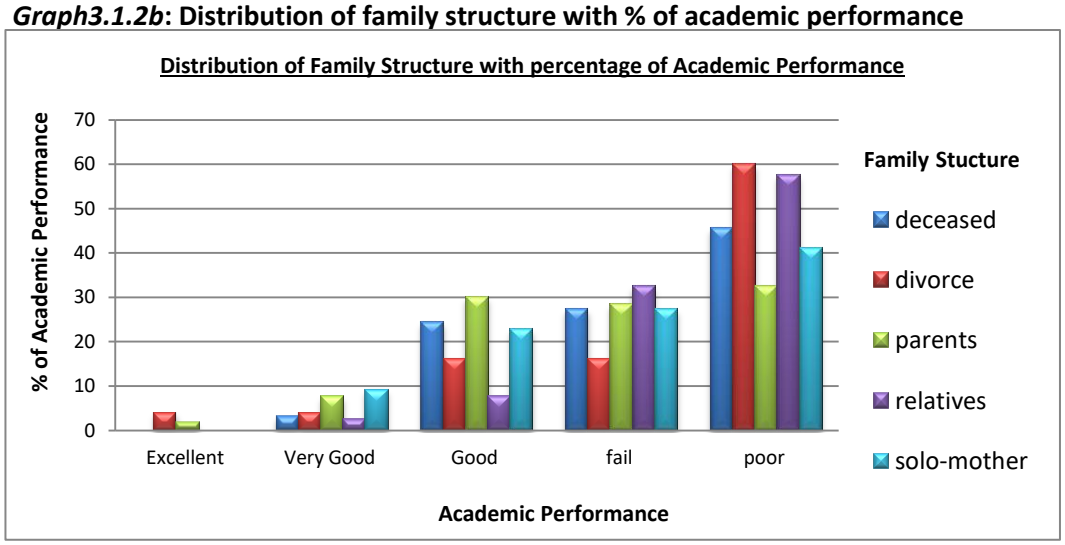


***Table3.1.2b:* Family Structure Distribution (non-traditional) partition with Academic Performance**

Family Structure	Total N =240 n	(%)	Excellent (N=3) n	(%)	Very Good (N=14) n	(%)	Good (N=56) n	(%)	Fail (N=66) n	(%)	Poor (N=101) n	(%)
Both Parents	120	(50.0)	2	(1.7)	9	(7.5)	36	(30.0)	34	(28.3)	39	(32.5)
Deceased	33	(13.8)			1	(3.0)	8	(24.2)	9	(27.3)	15	(45.5)
Divorce	25	(10.4)	1	(4.0)	1	(4.0)	4	(16.0)	4	(16.0)	15	(60.0)
With relatives	40	(8.3)			1	(2.5)	3	(7.5)	13	(32.5)	23	(57.5)
Solo-mother	22	(7.5)			2	(9.1)	5	(22.7)	6	(27.3)	9	(40.9)

***Source**: Schools Database in Tonga, 2016*

***Graph3.1.2b*: Distribution of family structure with % of academic performance**



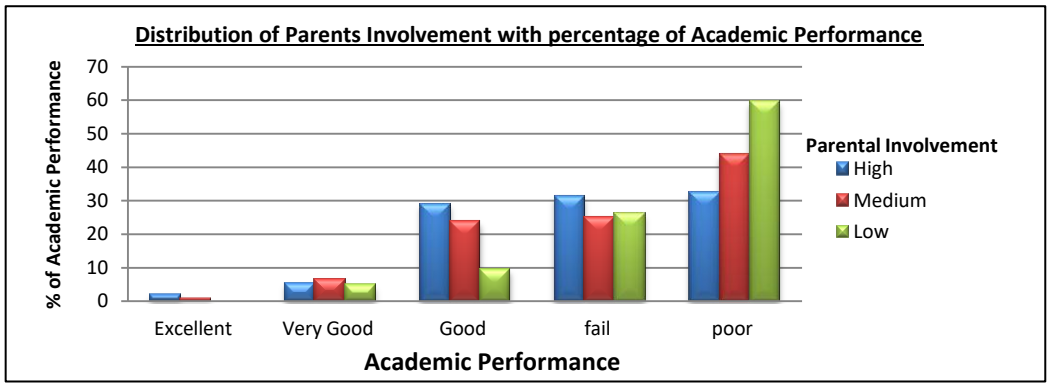
Nearly half the students were in the group with medium parental involvement had (43.8%) and only 17.5% were in the group of low parental involvement. ***Table3.1.2c*** and ***Graph3.1.2c*** indicate that when parental involvement was low, over half the students (59.5%) had poor achievement. In comparison, with very high parental involvement 36.5% of the students had good or higher achievement.

Table3.1.2c: Parents involvement distribution partition with Academic Performance

Parents' Involvement	Total N =240 n	(%)	Excellent (N=3) n	(%)	Very Good (N=14) n	(%)	Good (N=56) n	(%)	Fail (N=66) n	(%)	Poor (N=101) n	(%)
High	93	(38.8)	2	(2.1)	5	(5.4)	27	(29.0)	29	(31.2)	30	(32.3)
Medium	105	(43.8)	1	(0.9)	7	(6.7)	22	(23.8)	26	(24.8)	46	(43.8)
Low	42	(17.5)			2	(4.8)	4	(9.5)	11	(26.2)	25	(59.5)

***Source**: Interview data, 2017*

***Graph 3.1.2c* : Distribution of parental involvement with % of academic performance**



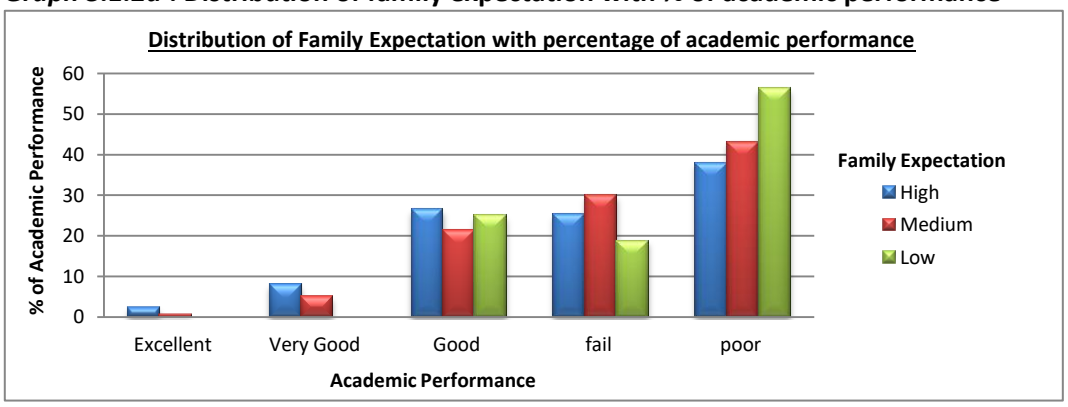
Half of the students (57.1%) were in the medium group for family expectation with 6.7% in the low group. With low family expectation, 56.2% of students had poor academic performance and 25.0% with good academic performance whereas, with high family expectation, 37.9% had with poor academic performance as shown in ***Table 3.1.2d*** and ***Graph 3.1.2d***.

Table3.1.2d: Family Expectation distribution partition with Academic Performance

Family Expectation	Total N =240 n	(%)	Excellent (N=3) n	(%)	Very Good (N=14) n	(%)	Good (N=56) n	(%)	Fail (N=66) n	(%)	Poor (N=101) n	(%)
High	87	(36.3)	2	(2.3)	7	(8.0)	23	(26.5)	22	(25.3)	33	(37.9)
Medium	137	(57.1)	1	(0.7)	7	(5.1)	29	(21.1)	41	(30.0)	59	(43.1)
Low	16	(6.7)					4	(25.0)	3	(18.8)	9	(56.2)

***Source**: Interview data, 2017*

***Graph 3.1.2d* : Distribution of family expectation with % of academic performance**



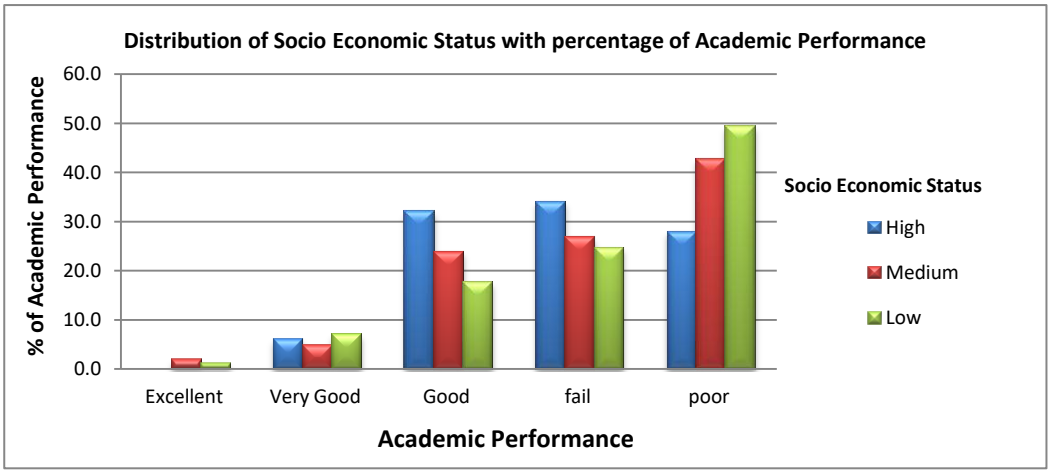
Socio-economic status (SES) had three categories and the most participants (43.8%) had medium SES with 20.8% high SES. With low SES, 49.4% had poor academic performance and 17.6% had a good academic performance. Whereas, with high SES 28.0% had poor performance and 32.0% were good performers as shown in ***Table 3.1.2e*** and ***Graph 3.1.2e*.**

Table 3.1.2e: Socio-Economic Status distribution partition with Academic Performance

Socio-economic Status	Total N =240		Excellent (N=3)		Very Good (N=14)		Good (N=56)		Fail (N=66)		Poor (N=101)	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
High	50	(20.8)			3	(6.0)	16	(32.0)	17	(34.0)	14	(28.0)
Medium	105	(43.8)	2	(1.9)	5	(4.8)	25	(23.8)	28	(26.7)	45	(42.8)
Low	85	(35.4)	1	(1.2)	6	(7.1)	15	(17.6)	21	(24.7)	42	(49.4)

***Source**: Interview data, 2017*

***Graph 3.1.2e* : Distribution of SES with % of academic performance**



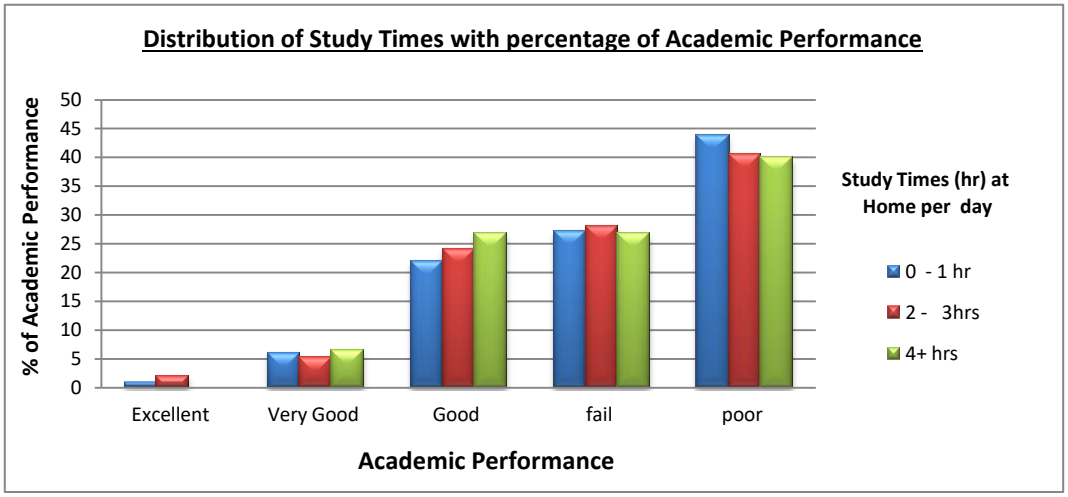
With regards to ***Table 3.1.2f*** and ***Graph 3.1.2f***, nearly half of the student (47.5%) did at most 1hour study time per day. Of these, 43.9% had poor academic performance and 21.9% with good performance. Few students (12.5%) did at least 4 hours study times, there was surprisingly little difference among the time spent studying and the percentages of poor achievers.

Table 3.1.2f: Study Times distribution partition with Academic Performance

Study Time at home (hr per day)	Total N =240		Excellent (N=3)		Very Good (N=14)		Good (N=56)		Fail (N=66)		Poor (N=101)	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
0 – 1 hrs	114	(47.5)	1	(0.9)	7	(6.1)	25	(21.9)	31	(27.2)	50	(43.9)
2 – 3 hrs	96	(40.0)	2	(2.1)	5	(5.2)	23	(24.0)	27	(28.1)	39	(40.6)
4+ hrs	30	(12.5)			2	(6.6)	8	(26.7)	8	(26.7)	12	(40.0)

***Source**: Interview data, 2017*

***Graph 3.1.2f* : Distribution of study time with % of academic performance**



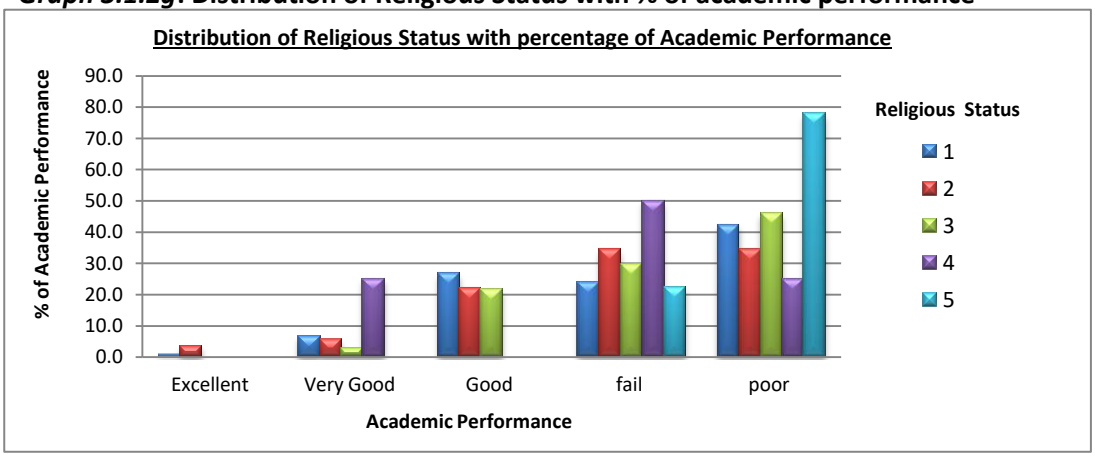
With reference to ***Table3.1.2g*** and ***Graph3.1.2g,*** the highest number of participants (56.3%) had very strong Christian faith (Rank 1) with a very few (3.8%) who had very week Christian faith. Of those with very weak faith (Rank 5) 77.7% had very poor academic performance but with only 9 students in this category these results should be received with caution.

Table 3.1.2g: Religious Status distribution partition with Academic Performance

Religious Status	Total N =240		Excellent (N=3)		Very Good (N=14)		Good (N=56)		Fail (N=66)		Poor (N=101)	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Rank1	135	(56.3)	1	(0.7)	9	(6.7)	36	(26.7)	32	(23.7)	57	(42.2)
Rank2	55	(22.9)	2	(3.6)	3	(5.6)	12	(21.8)	19	(34.5)	19	(34.5)
Rank3	37	(15.4)			1	(2.8)	8	(21.6)	11	(29.7)	17	(45.9)
Rank4	4	(1.7)			1	(25.0)			2	(50.0)	1	(25.5)
Rank5	9	(3.8)							2	(22.3)	7	(77.7)

***Source**: Interview data, 2017*

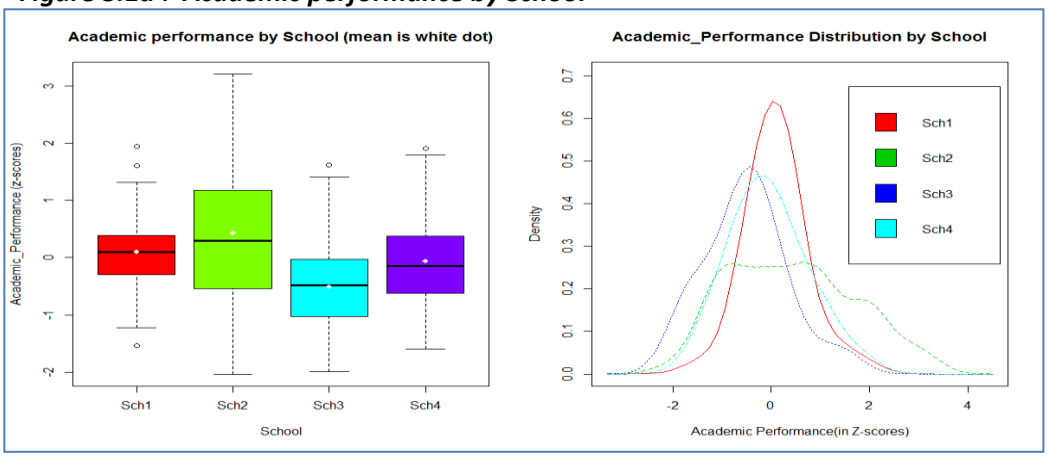
***Graph 3.1.2g*: Distribution of Religious Status with % of academic performance**



The overall mean for academic achievement is 44.5 with a standard deviation of 15.6. The following box plots and density plots were used to visualize the means and variations of academic performance by each of the independent variables.

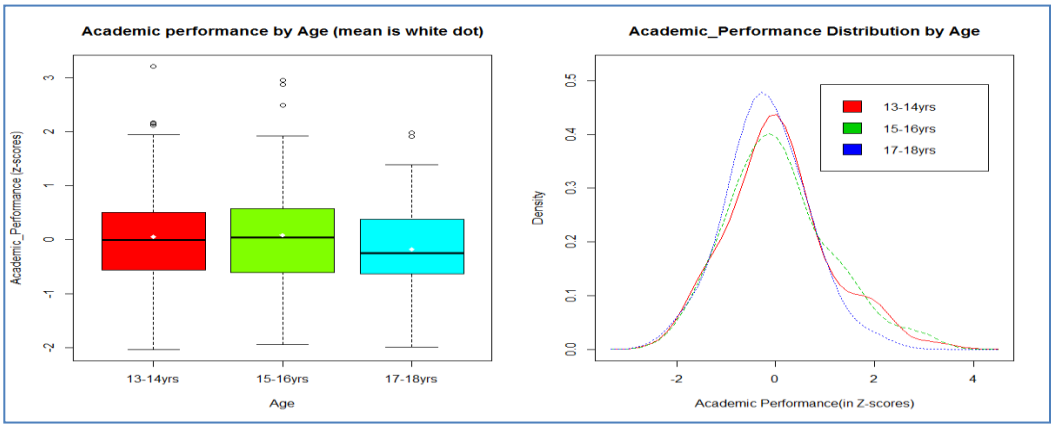
Figure 3.1a shows how the mean of academic performance changes between schools. The means differ among schools (some less and others more) with Sch3 presenting the lowest value and Sch2 the highest. It also shows that each school have a different amount of variation in academic performance with Sch1 showing the narrowest spread and Sch2 the widest. There was considerable overlap of the distribution of academic performance between schools, for example, Sch2 & Sch4.

Figure 3.1a : Academic performance by School



The distributions of academic performance among the three groups of age bands as shown in ***Figure3.1b*** below are very similar. The academic performances among the younger students (13 – 14yrs & 15 – 16yrs) were almost the same and the older students (17 – 18years) had the lowest mean and variation.

Figure 3.1b : Academic performance by Age band



The variations of the academic performance appear similar for both male and female students. However, females had a higher mean as shown in ***Figure3.1c*** below.

Figure 3.1c : Academic performance by Gender

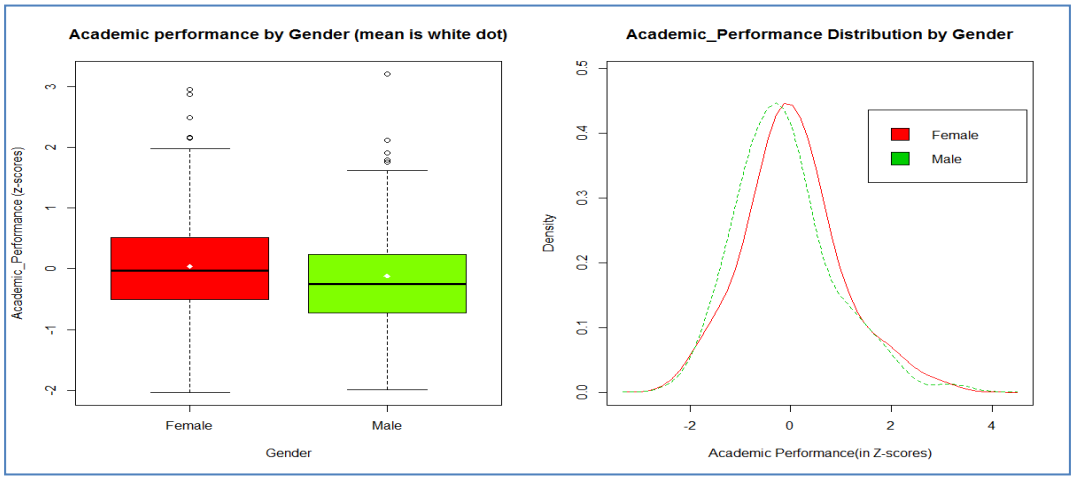


Figure3.1d shows some differences in means and variations in the academic performance of students from traditional families and those from non-traditional families. Students of traditional families had a higher mean than the students from non-traditional families.

Figure 3.1d : Academic performance by Family Structure

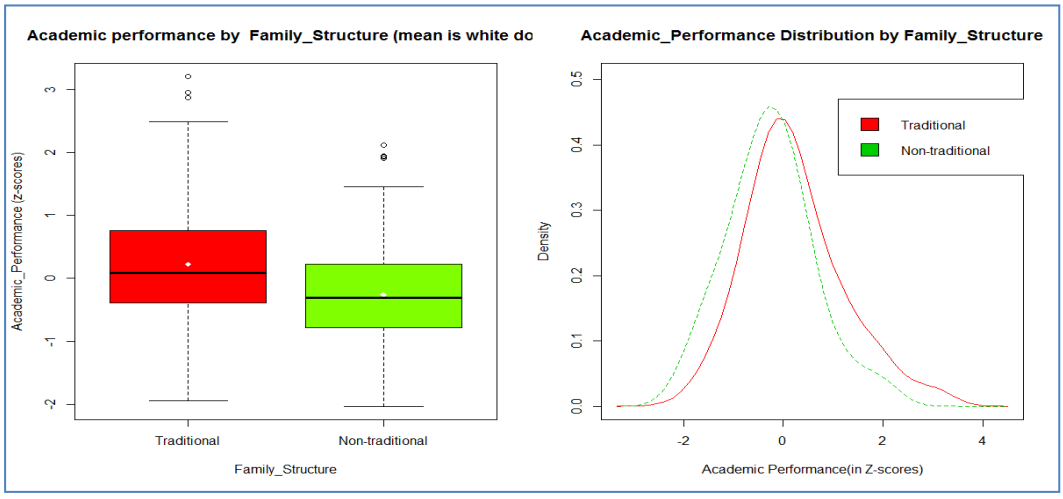
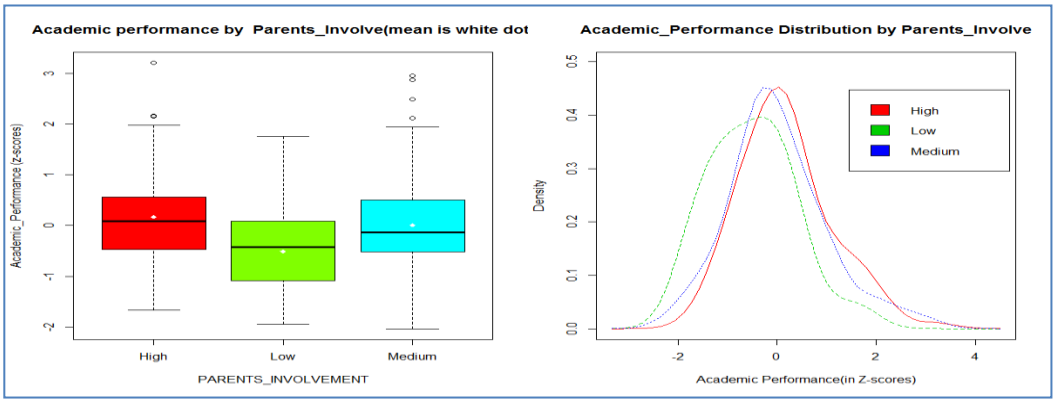


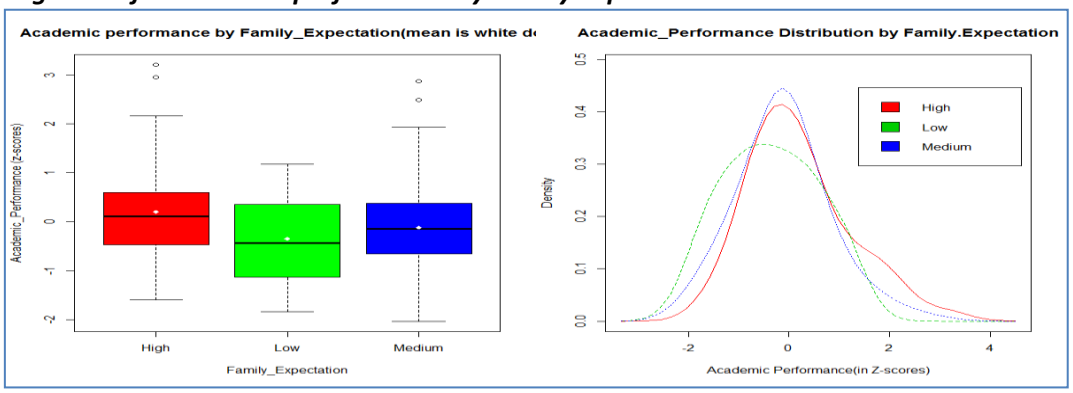
Figure3.1e shows that there was little difference between the distribution of academic performance among students from a high and medium parental involvement groups. The low parental involvement group was overall lower, and more varied. All average academic performance of the three groups of parental involvement was different with the highest mean in the high level.

Figure 3.1e : Academic performance by Parental Involvement



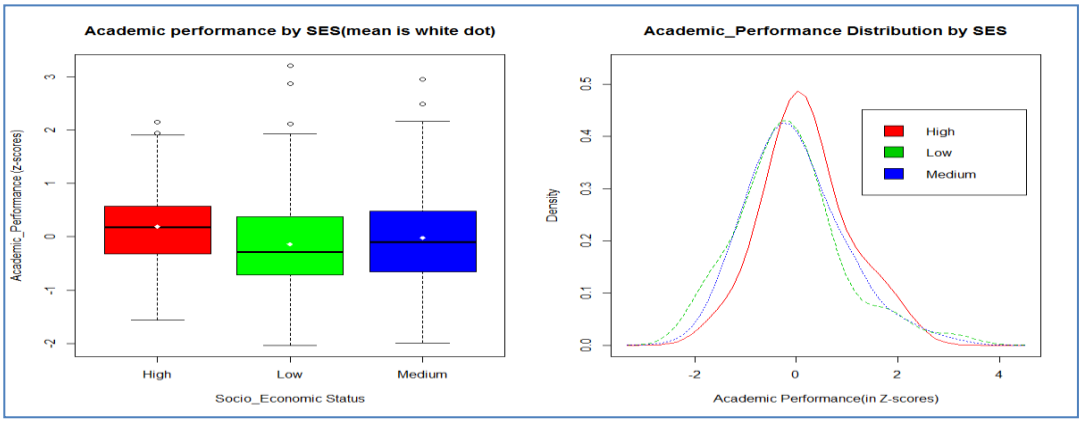
There appear to be differences in the means for the academic performance among the students from the three levels of family expectation with the lowest mean in the low level as shown in ***Figure3.1f***. The academic performance variation appear different for all of the three levels with the widest spread in the in the low level.

Figure 3.1f : Academic performance by Family Expectation



The lowest variations and the highest mean of academic performance were students from families with high SES. The medium and low SES groups had similar variations with the medium SES families having slightly higher mean performance as shown in ***Figure3.1g*** below.

Figure 3.1g: Academic performance by Family Socio-Economic Status



There were 5 ranks for the religious status and I had combine rank 3 to 5 as one Rank 3+. ***Figure 3.1h*** shows some overlaps in the distribution of academic performance of religious status between Rank1 and Rank2. It also indicates different means for all three levels of religious status.

Figure 3.1h: Academic performance by Family Religious Status

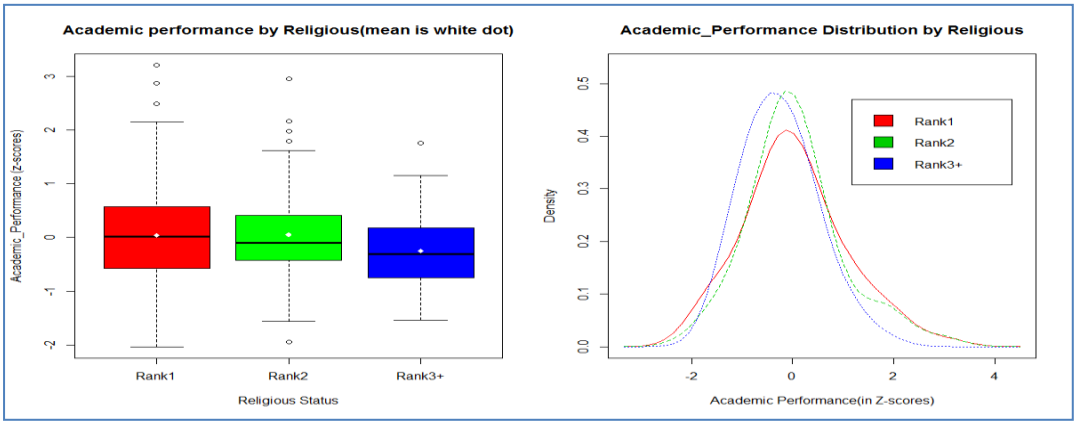


Figure3.1i shows much overlap values between (0-1hr) and (2-3hrs) with similar variations of the academic performance between (0-1hr) and (4+hrs) groups. All means were different among the three levels of study times with the highest mean in the group which study at home for at least 4 hours per day.

Figure 3.1i: Academic performance by Study Time at home (hr per day)

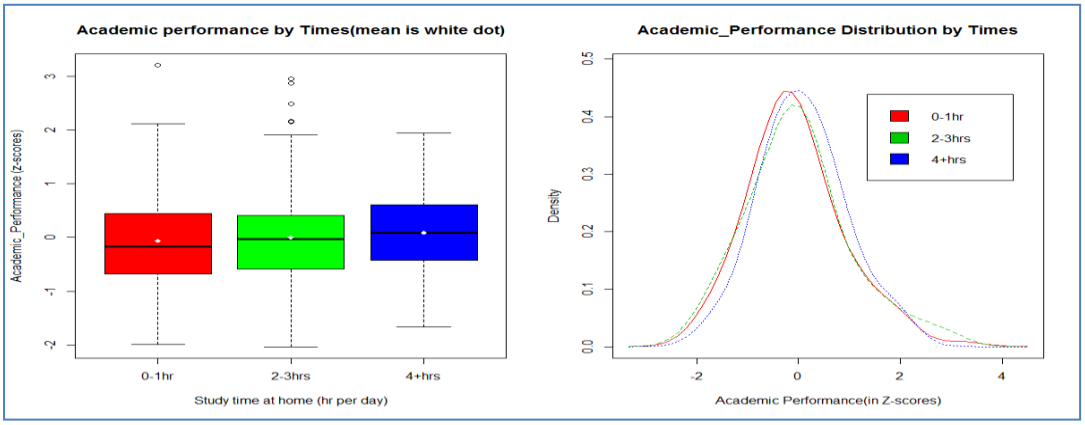
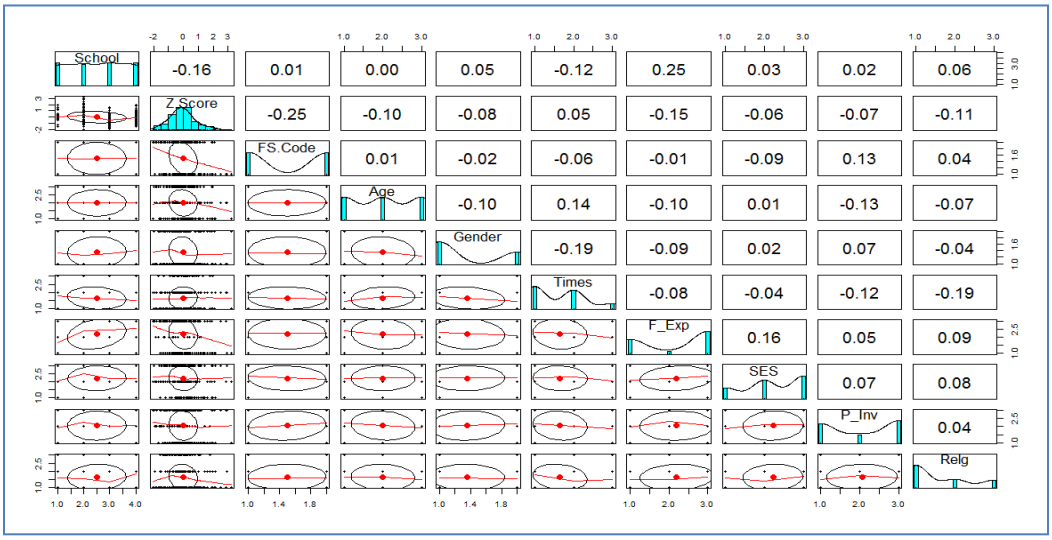


Figure3.1a to 3.1i show differences between the means among the groups of each explanatory variable. Regression models and ANOVA in the modelling section would clarify whether these differences were significant and help in identifying whether the variations among the means are due to true differences about the population means or a result of sampling variability.

3.2 Statistical Analysis

Before running the model, an inspection of the data as shown in ***Figure 3.2a*** below indicated that family structure was negatively correlated to the academic performance (shown here as z-score). Family structure appears to be the strongest compared to all the other explanatory factors in their relationship with the academic performance. Study time at home was the only predictor that was positively related to the academic performance and the others having negative relationship.

Figure 3.2a : Correlation Matrix among the variables



Inspecting ***Figure 3.2a*** above, there appears that there were no highly correlated independent variables that might create multi-collinearity problems. However, I calculated the Variance Inflation Factor (VIF) for confirmation as shown in ***Table 3.2a.*** Since all the VIF were below 5, this dataset is considered free from multi-collinearity problems.

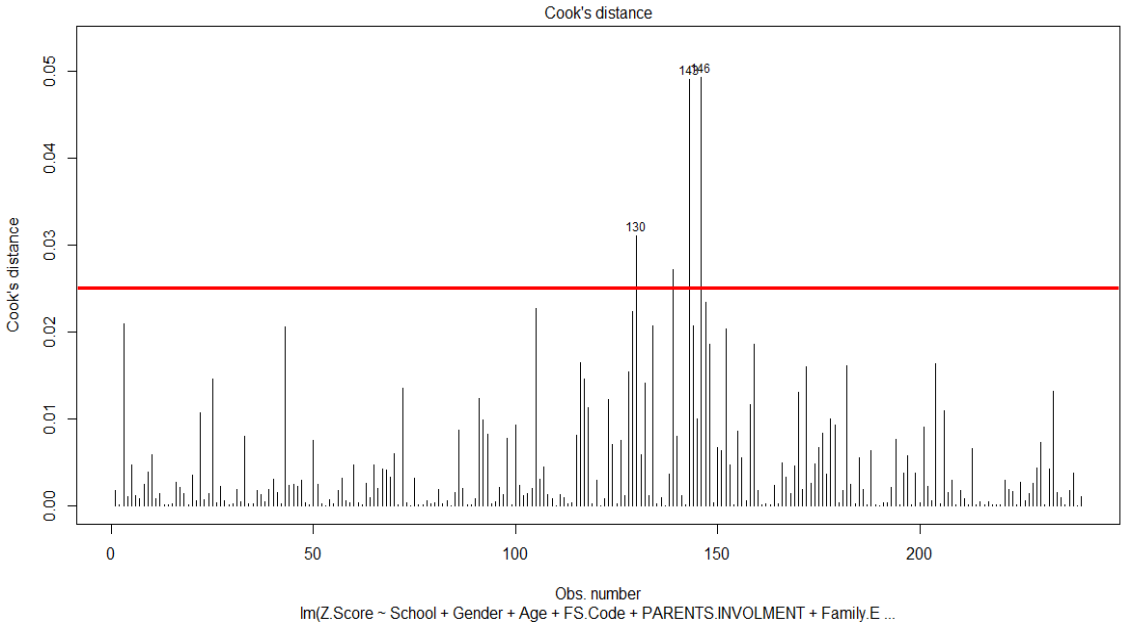
Table 3.2a: **Multi-collinearity test using Variance Inflation Factor (VIF)**

	F_STR	School			Gender	Age		P-INV		F_EXP		SES		Religious S		Times	
	N-Trad	S2	S3	S4	M	15-16	17-18	M	L	M	L	M	L	R2	R3+	2-3	4+
VIF	1.126	1.707	1.745	1.669	1.105	1.402	1.432	1.302	1.427	1.317	1.236	1.965	2.206	1.134	1.266	1.342	1.256

F-STR – Family Structure; P-IV – Parental Involvement ; F_Exp – Family Expectation ; N-Trad – non-traditional; SES – Socio-Economic-Status

The data was also inspected for outliers as shown below in ***Figure3.2b***. The model showed improvement without the outliers so I decided to remove these three most influential outliers from the dataset. This left only 237 participants for the modelling. These three students were from Sch2.

Figure 3.2b: Plot for outliers inspections



3.2.1 Predictor Models

Before running any of the models, due to very small sample size in some of the variables levels, recoded was done to some of them, for example, religious status, Rank3+ is the combination of Rank 3, 4 and 5. Similarly, academic performance for the ordinal logistic regression was also recoded with the very good category being the combination of both excellent and very good categories.

3.2.1a. Univariate Linear Regression

Table 3.2.1a summarizes the outcome of individual univariate linear regressions between the academic performance and each explanatory variable. The F-value for school (11.14), family structure (15.55), parental involvement (7.54) and family expectation (3.92) were greater than their corresponding tabulated F-value with each p-value less than 0.05. Hence each factor (school, family structure, parental involvements and family expectation) independently has significant direct effects on academic performance, whereas age, gender, religious status, SES and study time at home each did not have significant direct relationship with academic performance.

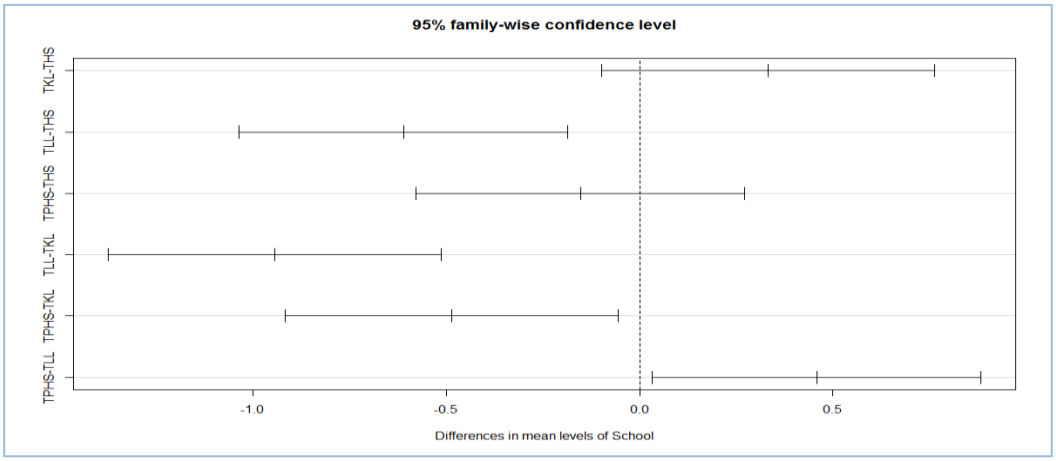
Table3.2.1a: Summary of Simple Linear Regression outcomes of each predictor

Independent Variables	F-statistics,	p-value,	degrees of freedom	R-Squared
Demographics				
School	11.14	7.35e-07	3 and 233	12.6%
Age	1.68	0.189	2 and 234	1.4%
Gender	1.61	0.205	1 and 235	0.7%
Other potential measure				
Family Structure	15.55	0.0001	1 and 235	6.2%
Parental Involvement	7.54	0.0007	2 and 234	6.1%
Family Expectation	3.92	0.021	2 and 234	3.2%
Religious Status	1.92	0.150	2 and 234	1.6%
Socio-Economic Status(SES)	1.92	0.149	2 and 234	1.6%
Study Time at Home(hr per day)	0.29	0.751	2 and 234	0.2%

Tabulated F-Statistics with alpha = 0.05 ; df1 and df235 = 3.88 ; df2 and df234=3.034; df3 and df233 = 2.64

Referring to the relationship between school and academic performance, the variation of academic performance means among different schools is much larger than that of academic performance within each school. At this point, we know that not all the means among the schools are equal and since school has more than 2 levels (it has 4), and this finding could be because one school was very different from the others. A Tukey POST HOC test was conducted to determine which individual schools were different from others. As shown by ***Figure 3.2.1a*** below, the significant differences are the ones with the confidence interval that do not cross the zero value. The results suggest significant difference in academic performance is between Sch1 & Sch3, Sch2 & Sch3, Sch2 & Sch4 and Sch3 & Sch4. This is not a straightforward result and is difficult to interpret.

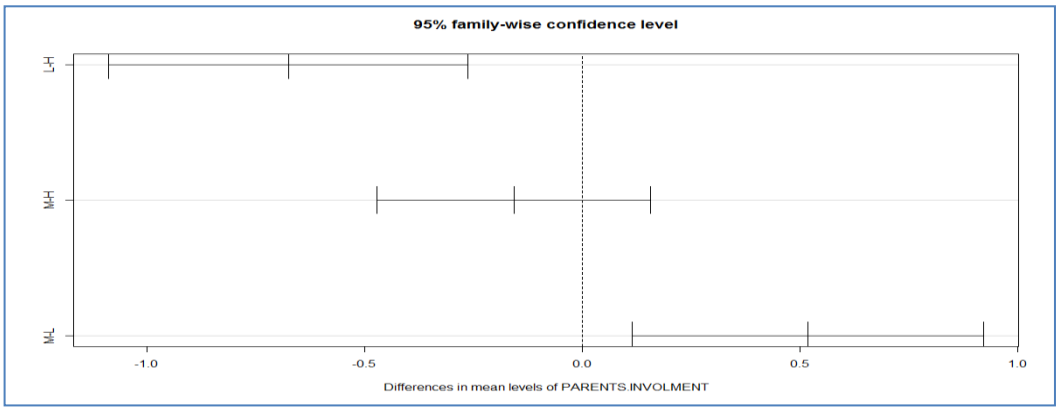
Figure 3.2.1a : Confidence interval (95%) of academic performance between schools.



THS = Sch1; TKL = Sch2; TLL = Sch3; TPHS = Sch4

Similarly, observing the relationship between parental involvement and academic performance, the variation of the academic performance means among the level of parental involvement is greater than that within the each level. The outcome of the Tukey POST HOC test displayed by ***Figure 3.2.1b*** given below, and shows that the significance difference in academic performance among the parental involvement levels is between low & high and low & medium parental involvement as the confidence interval for each pair does not cross zero. This suggests most of the differences are between low group and the other two groups.

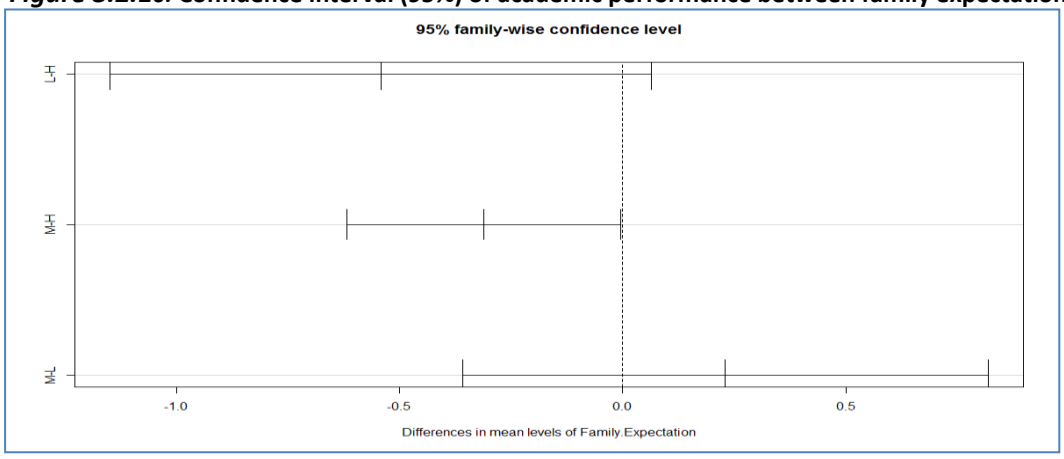
Figure 3.2.1b: Confidence interval (95%) of academic performance between parental involvement levels.



L = low, M = Medium, High = High

The outcome from the univariate modelling has indicated that there was significant variation of the academic performance mean among the family expectation levels also. ***Figure 3.2.1c*** visualizes the outcome of the Tukey POST HOC test on the relationship between academic performance and family expectation. It shows that the significance difference in academic performance among the family expectation levels is between the medium & high levels.

Figure 3.2.1c: **Confidence interval (95%) of academic performance between family expectation levels.**



L = low, M = Medium, High = High

3.2.1b. Logistic and Ordinal logistic regressions

A summary of logistic models of each explanatory variable with academic performance shown in ***Table 3.2.1b*** suggests that school, family structure and parental involvement have independently significant direct effects on academic performance. In this model students were scored either pass or fail creating a two outcome response variable.

Table3.2.1b: **Summary of Logistic Regression outcome of each predictor**

Independent Variables	Logistic		
	Chi-square,	p-value ,	df
Demographics			
School	18.313	0.0004	3
Age	1.184	0.5531	2
Gender	2.003	0.1570	1
Other potential measure			
Family Structure	8.668	0.0032	1
Parental Involvement	9.192	0.0101	2
Family Expectation	2.668	0.2635	2
Religious Status	3.236	0.1983	2
Socio-Economic Status(SES)	0.443	0.8014	2
Study Time at Home(hr per day)	1.294	0.5236	2

Tabulated χ^2 with alpha = 0.05 ; df1 = 0.1769***; df2 =***0.0246***; df3 =*** 0.0029***; df = degrees of freedom***

With reference to the summary of the ordinal logistic models between the five levels of academic performance and each predictor shown in ***Table3.2.1c***, the results suggest that school, family structure, parental involvement and religion status independently have significant direct effects on academic performance.

Table 3.2.1c : Summary of ordinal logistic Regression outcomes for each predictor

Predictors	C. Int , p – value	*Predictors*	Con. Int, p – value	*Predictors*	C. Int, p- value
School		**Age Band**		**Gender**	
Sch1	Reference	13 – 14 years	Reference	Female	Reference
Sch2	(-1.18, 0.17), 0.141	15 – 16 years	(-0.37, 0.78), 0.476	Male	(-0.01, 0.98), 0.055
Sch3	(0.65, 2.01), 0.0001	17 – 18 years	(-0.17, 0.97), 0.167		
Sch4	(-0.24, 1.04), 0.216				
Family Expectation		**Family Structure**		**Parental Involvement**	
High	Reference	Traditional	Reference	High	Reference
Medium	(-0.12, 0.81), 0.137	Non-Traditional	(0.38, 1.34), 0.0004	Medium	(-0.17, 0.86), 0.189
Low	(-0.25, 1.81), 0.138			Low	(0.47, 1.90), 0.001
Religious Status		**Socio-economic Status**		**Times**	
Rank1	Reference	High	Reference	0-1hr	Reference
Rank2	(-0.63, 0.51), 0.830	Medium	(-0.15, 1.06), 1.140	2-3hrs	(-0.60, 0.40), 0.701
Rank3+	(-0.06, 1.16), 0.078	Low	(0.08, 1.36), 0.028	4+hrs	(-0.92, 0.56), 0.641

C.Int = Confidence Interval

Table3.2.1d shows predictors that were significant for predicting academic performance in the three different regressions (Univariate Linear, Logistic, Ordinal logistic). They have similar outcomes except for family expectation (linear) and religious status (ordinal)

Table 3.2.1d. Significant predictors for each regression model

Linear	**Logistic**	**Ordinal logistic**
School	School	School
Family structure	Family structure	Family structure
Parental involvement	Parental involvement	Parental involvement
Family expectation		Religious Status

3.2.2 Reduced Multivariate Model

The focus of this modelling is to produce a parsimonious model with good explanatory predictive power, which can explain academic performance with a minimum number of independent variables. Stepwise backward elimination selection method was used to select the final model. The other methods mentioned in this chapter 3 were used to confirm this choice.

Table 3.2.2a : Summary of Model Selection using stepwise backward elimination and AIC

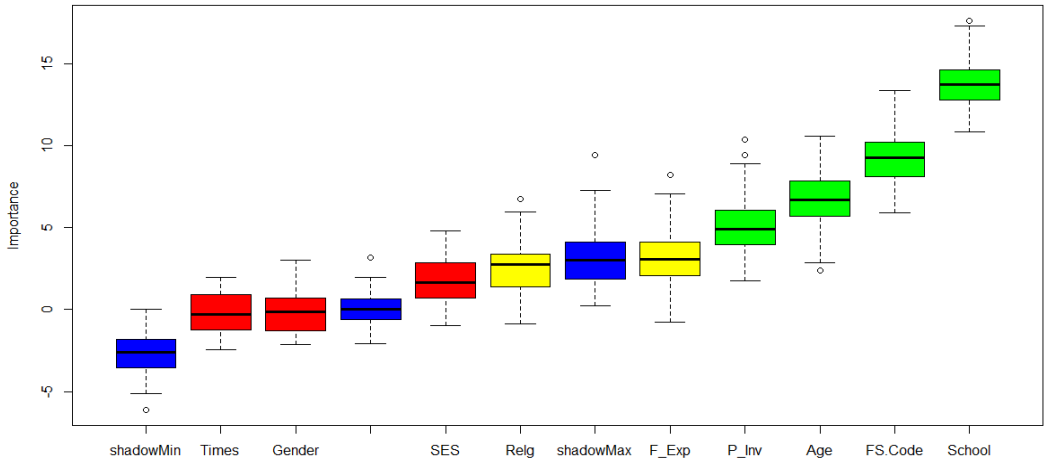
Models	Description	Insignificant variable(s)	Adjusted-R^2	AIC
Model 1	Full Model	SES, Times & Gender	24.2%	-69.47
Model 2	Without SES	Times & Gender	24.4%	-72.12
Model 3	Without SES & Times	Gender	23.9%	-72.35
Model 4	Without SES ,Times & Gender	None	23.4%	

SES = Socio-economic Status

Firstly, backward elimination was used for selection of the best model by deleting the insignificant predictors one by one starting from the one with the highest p-value greater than 0.05. As shown in ***Table3.2.2a*** above, the adjusted-R^2 decreased when times and gender were deleted from the model. Running the stepwise backward elimination automatically using AIC, Model 3 was the chosen model. I finally choose Model 4 as the best model which has the following variables; school, parental involvement, family structure, age, family expectation and religious status.

Boruta (Kursa & Rudnicki, 2010) performed 99 iterations in 17.22109 seconds and ***Figure3.2.2a*** visualizes the result of the variable selection. The minimal, average and maximum z-scores of the shadow variable are represented by the blue boxplots. Green represents confirmed variables (important variable), the tentative variables are in yellow and red are variables which are rejected. Out of the nine explanatory variables, four (age, family structure, parental involvement and school) were confirmed important, two (family expectation and religious status) were selected as tentative and three (gender, times and SES) were rejected.

Figure 3.2.2a : Boruta result plot



Referring to the outcome from the Mallows Cp selection method shown in ***Figure3.2.2b*** below, the model with the smallest Mallow's Cp (9.1) selected the following variables; school, parental involvement, family structure, age, family expectation and religious status.

Figure 3.2.2b : Mallows Cp plot

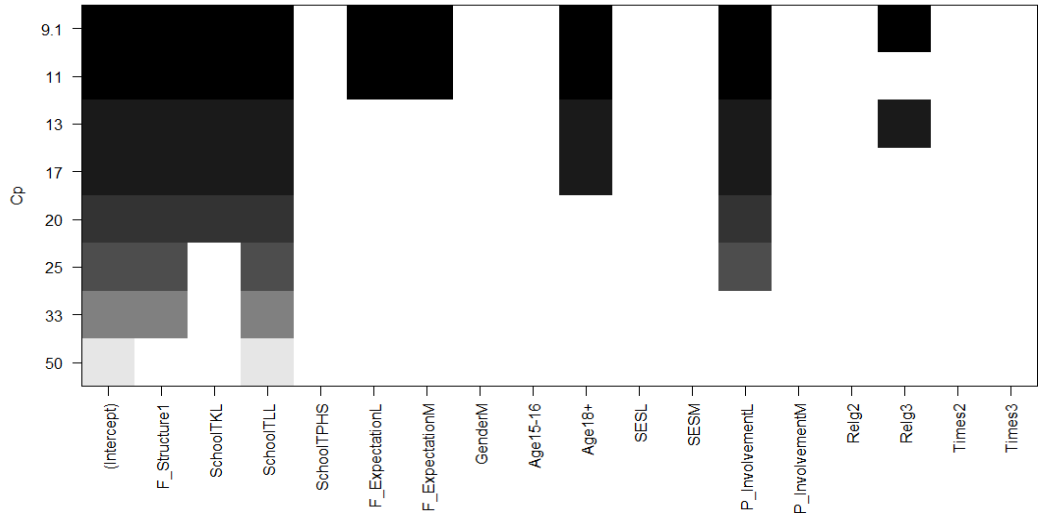
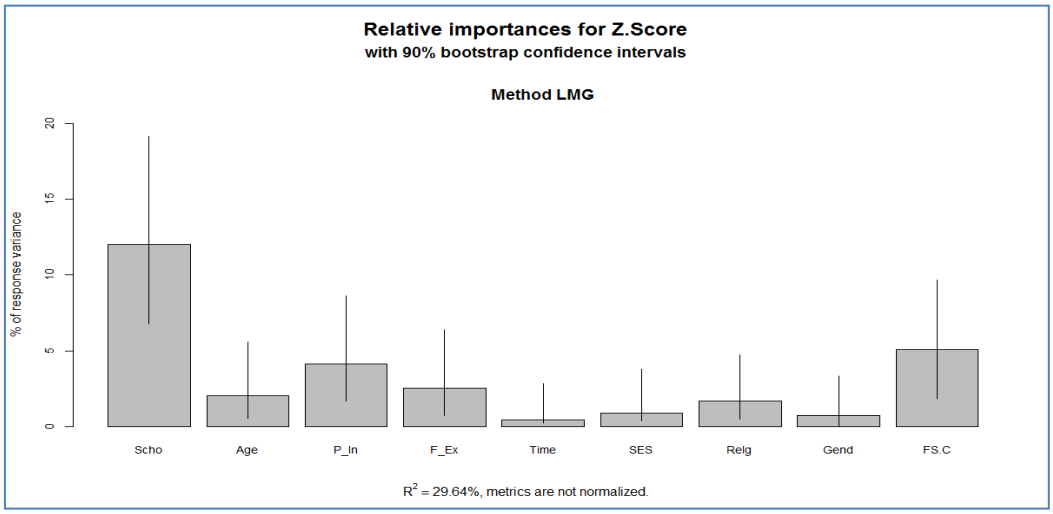


Figure3.2.2c shows relative importance (Grömping, 2006) of explanatory variables for regression of academic performance on all the independent variables. The relative importance is evaluated by different methods and finding the average in order of the sum-of-squares achieved from all possible ordering of the explanatory variables (known as lmg) method was used in this selection.

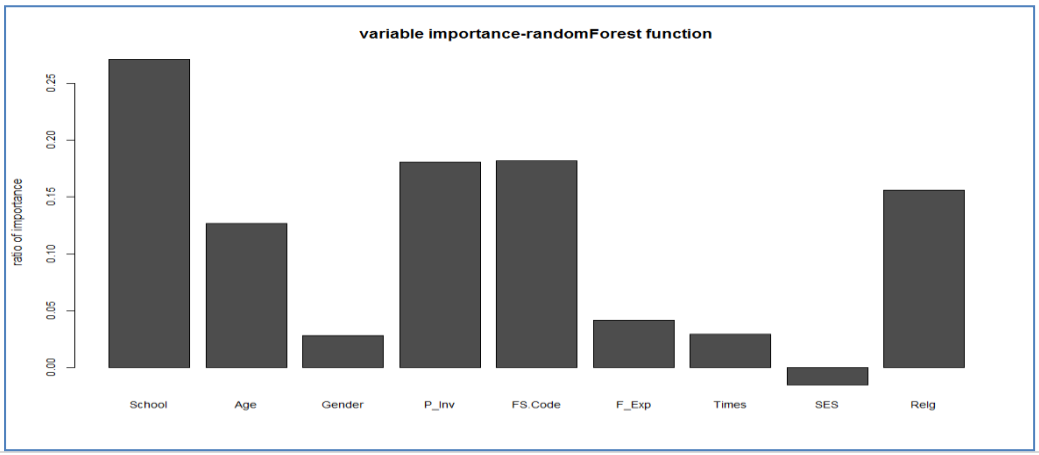
Figure 3.2.2c : Relative importance plot (Relaimpo package in R)



LMG = an averaging of the sequential sum-of-squares obtained from all possible orderings of the predictors
Z.Score = academic performance

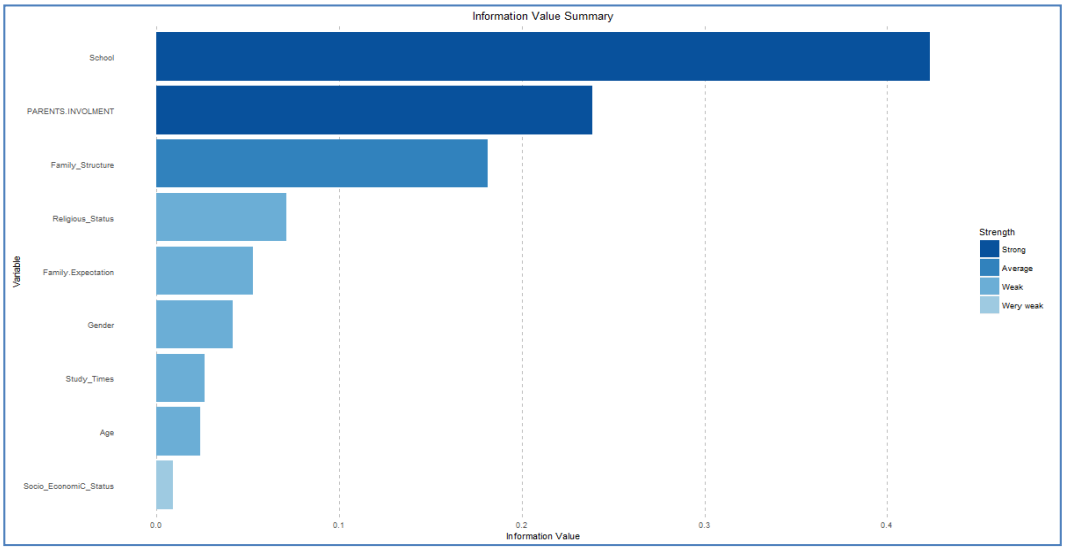
To identify the explanatory variables that best explain the variance in the response variable, random forests are a useful tool (Breiman, 2001) to be used. ***Figure3.2.2d*** shows the variance important plot using the random forest function in randomForest package. School has the highest importance, parental involvement (P_Inv) and family structure (FS.Code) have almost similar ratio of importance and family expectation, age and religious status are also important.

Figure 3.2.2d : **Variance importance plot – random forest function**



The final method used to explore importance was the *Information-Value* package in R. ***Figure3.2.2e*** shows the summary of the information value. It indicates that school and parental involvement have strong strength in predicting academic performance with school as the strongest. Family structure has average strength where as the rest of the variables show weak strength with SES as the weakest.

Figure 3.2.2e Information Value summary.



Both Mallow's CP selection and Backward Elimination methods selected school, parental involvement, family structure, age, religious status and family expectation as the key drivers to explain most of the academic performance whereas AIC made an addition to this list by including gender. Looking at the summary in ***Table 3.2.2b***, even though there are differences in the order of importance in all of the four methods but it is clear that school, parental involvement and family structure are the most influential predictors of academic performance whereas SES, gender and study time at home are the least important.

Table 3.2.2b: ***Predictors in order of the strength of importance for the prediction of academic performance***

Order of importance	Boruta	Relative importance	Random Forest	Information Value
Strong	School	School	School	School
.	Family structure	Family structure	Parental involvement & Family structure	Parental Involvement
.	Age	Parental Involvement	Religious Status	Family Structure
.	Parental Involvement	Family Expectation	Age	Religious Status
.	Family Expectation	Age	Family Expectation	Family Expectation
.	Religious Status	Religious Status	Gender & Time	Gender
.	SES	SES	SES	Study Time
.	Gender	Gender		Age
Weak	Time	Time		SES

Based on all the above methods school, parental involvement, family structure, age, family expectation and religious status were selected as the predictors for the final multivariate regression models. Shown in ***Table 3.2.2c*** given below are the outcomes of the final multivariate models from linear, logistic and ordinal logistic regressions. Linear regression was the main analysis model and logistic and ordinal logistic regressions were used as confirmation of the result from the linear model. There are some consistent results shown among these models, like for example school, family structure and parental involvement were significant predictors of academic performance in all models. Age and religious status showed significant relationships with academic performance in both linear and ordinal logistic regressions with family expectation selected only by the linear model as one of the significant factors.

Table 3.2.2c **Outcome of the final model from each Regression Models (Linear, Logistic, Ordinal Logistic)**

Potential Predictors	Linear Regression Co-eff, (Con.Int), p-value	Logistic Regression Co-eff, (Con.Int), p-value	Ordinal Logistic Regression Co-eff, (Con.Int), p-value
School			
Sch_1	Reference		
Sch_2	0.42,(0.11, 0.74), 0.008*	1.17, (0.32 , 2.05), 0.008*	-0.76,(-1.50, - 0.03), 0.040*
Sch_3	-0.50,(-0.82, -0.19), 0.002*	-0.97, (-2.01, -0.01), 0.054	1.31,(0.57, 2.05), 0.0005*
Sch_4	0.02,(-0.29, 0.33), 0.896	0.15, (-0.73 , 1.03), 0.741	0.13,(-0.57, 0.82), 0.724
Parents' Involvement			
High	Reference		
Medium	-0.16, (-0.40 , 0.09), 0.219	-0.57, (-1.26 , 0.09), 0.093	0.42,(-0.13, 0.98), 0.138
Low	-0.49, (-0.79, - 0.13), 0.006*	-1.29, (-2.51, - 0.22), 0.025*	0.98,(0.19, 1.77), 0.015*
Family Structure			
Traditional	Reference		
Non-Traditional	-0.39,(-0.61, - 0.17), 0.0006*	-0.81,(-1.46, - 0.17), 0.014*	0.80, (0.28, 1.32), 0.002*
Age Band (2 years)			
13 – 14 years	Reference		
15 – 16 years	-0.02,(-0.28, 0.25), 0.897	-0.32,(-1.09 , 0.42), 0.394	0.37,(-0.32, 0.88), 0.233
17 – 18 years	-0.32,(-0.58, -0.05), 0.020*	-0.70,(-1.49, 0.07), 0.077	0.72,(0.09, 1.33), 0.023*
Religious Status			
Rank1	Reference		
Rank2	-0.07, (-0.34, 0.20), 0.616	-0.41, (-1.21, 0.36), 0.304	0.11,(-0.50, 0.72), 0.722
Rank3+	-0.30, (-0.59, -0.02), 0.037*	-0.72, (-1.62, 0.10), 0.096	0.64,(0.02, 1.30), 0.058
Family Expectation			
High	Reference		
Medium	-0.26, (-0.50, -0.02), 0.019*	-0.33, (-1.18, 0.20), 0.166	0.35,(-0.53, 0.69), 0.083
Low	-0.55, (-1.01, -0.09), 0.036*	-0.78, (-2.40, 0.49), 0.226	1.03,(0.06, 1.39), 0.227
	Adjusted R-Square = 23.4%		

** p-value < 0.05;* ***Significant level for all analysis is 0.05 ; Co-eff – Coefficient; Con.Int – Confidence Interval***

With reference to the outcome of the final multivariate linear model shown in ***Table3.2.2c*** (column1), on average, when other variables were held constant, the model suggested that in 2016 students from Sch1 performs academically 42% of standard deviation times poorer than their counterparts from Sch2; and 50% of standard deviation times better than those from Sch3. Similarly, students from Sch2 perform academically 92% of standard deviation better

than those from Sch3 and 40% of standard deviation better than Sch4. Additionally, students from Sch4 performed academically 52% times better than those from Sch3. However, there was no significant difference in the mean of the academic performance between the students from Sch1 and Sch4.

From the model, on average, students with low parental involvement performs academically 49% of the standard deviation times poorer than those with high parental involvement and 33% of the standard times poorer than their counterparts with medium parental involvement. However, there was no significant difference in the means of the academic performance between high and medium parental involvement. This is the result when all the other predictors were held constant.

Base on the model, when other variables were held constant, students from non-traditional families performed, on average, 39% of standard deviation times poorer than students from traditional families.

According to the model, on average, younger students (13 – 14years) performed academically 32% of standard deviation times better than the older students (17 – 18 years) and 15 – 16years students performed academically 30% times better than the older students. However, there is no significant difference between the academic performances of the two younger groups (13 – 14 years & 15 – 16years).

The final model indicates that on average students with high family expectation performed academically 26% of standard deviation times better than those with medium family expectation and 55% of standard deviation times better than their counterparts with low family expectation.

Additionally, the model suggests that on average, students from high religious rank families performed academically 30% of standard deviation times better that those from low religious rank families but they were not significant difference from those from medium religious rank families.

Overall, the highest performance would be expected from a student from school Sch2, aged between 13 – 16 years, with a traditional family structure, where parents had a sufficient involvement in their academic life, had religious rank 1 and there were high family expectations.

3.2.2.1 Residuals analysis

The assumption for normality of the final multivariate linear model was assessed with the examination using the Q-Q plot and histogram shown in ***Figure 3.2.2.1a*** below. These were slightly skewed as some deviation is to be expected, particularly near the ends but most were within the confidence interval. This is also shown in the diagnostic plots (***Figure 3.2.2.1b*****)** in the top-right (Normal Q-Q). Most of the points lie on the line and on few deviations at both ends, but overall the assumption was considered to be met.

Figure 3.2.2.1a : Q-Q plot and histogram of residuals

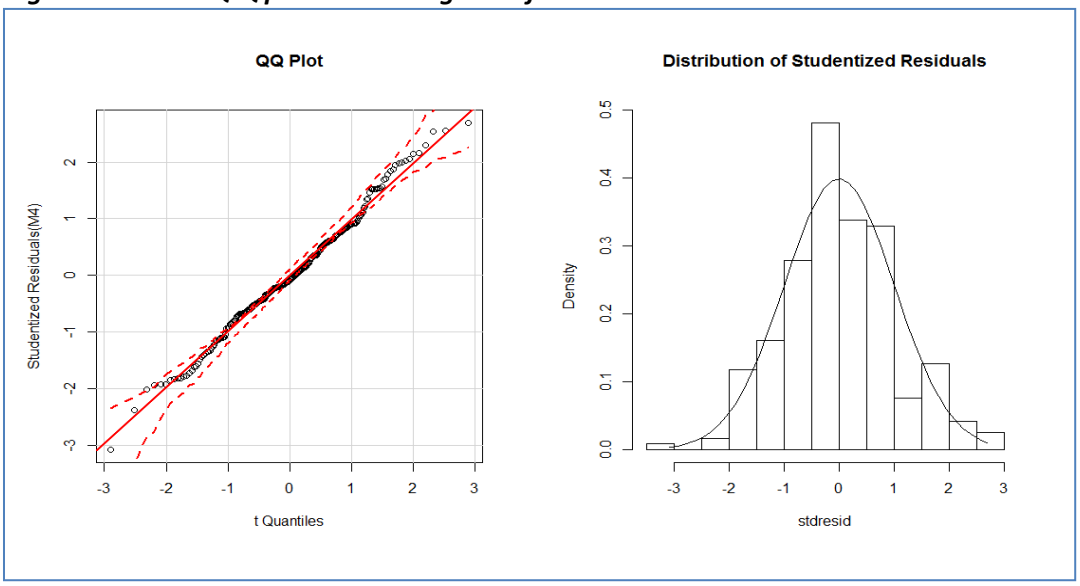
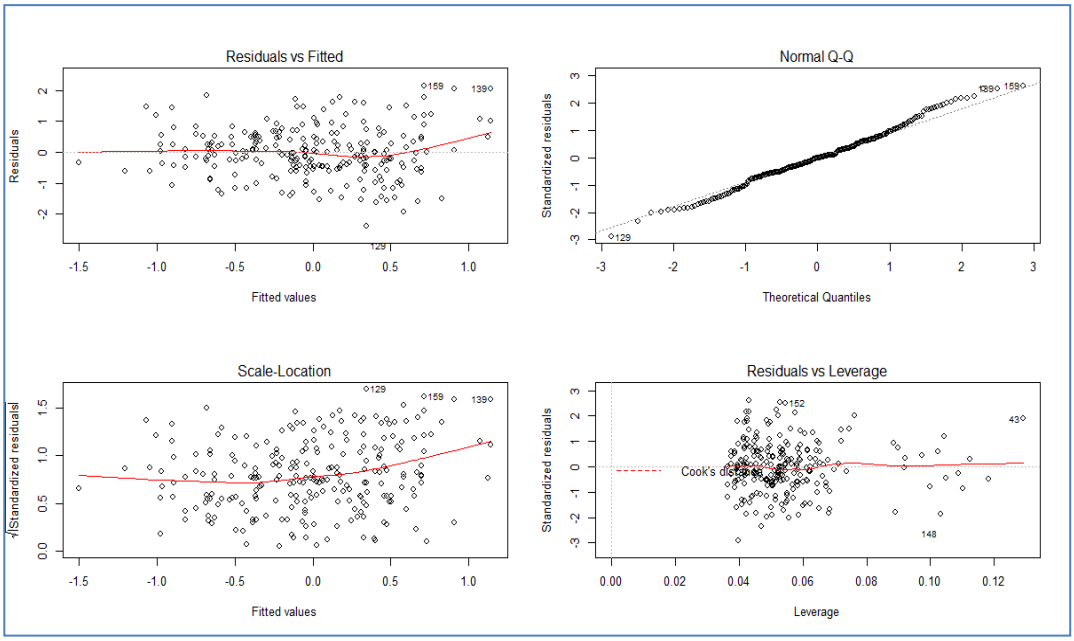


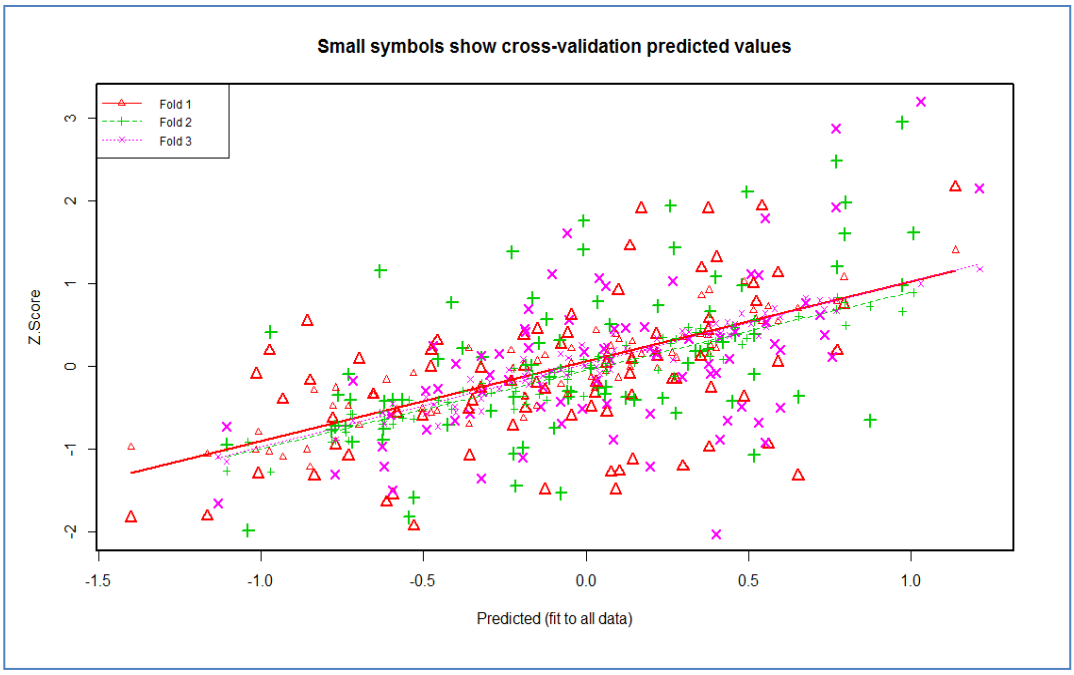
Figure 3.2.2.1b: Diagnostic plots for the final multivariate linear model.



The mean of residuals was 1.75e-17, which is very small and close to zero. With reference to ***Figure 3.2.2.1b*****,** the points on the first plot (top-left) appear random and the red line looks approximately flat except at the right end. The plot on the bottom left also confirms this and the assumptions were considered to be met.

Over-fitting is one of the serious concerned in modelling of real data. Cross-validation was used to verify that the model used in this analysis was not over-fitted. Over-fitting is *"when the model requires more information than the data can provide"* (Harrell, Lee, & Mark, 1996). K-folds cross validation used by DAAG package in R (Maindonald & Braun, 2011) was employed for this verification. This method randomly splits data into training sets and testing sets. This is done by removing k-folds for testing while the training is done on the remaining data (Harrel, 1998). Inspecting the errors of each of the 3- folds, the difference is small as indicated by ***Figure 3.2.2.1c*** given below and therefore the model was considered to not be over-fitted.

Figure 3.2.2.1c : Plot of the 3-folds cross validation



CHAPTER FOUR: DISCUSSION

This study demonstrates that the schools, parental involvement, family structures, age, family expectations and Christian faith in GOD (religious status) in Tonga are substantial indicators (or predictors) of the academic success of students.

As I expected, there were difference in students' academic performance between different secondary schools. There are various possible reasons for this. First, schools have different teachers with different teaching experiences and methods. As such, the quality of education may reflect these teacher differences. Second, the schools will have different quantities and qualities of, and access to, resources. Third, the students' examinations were set by a variety of different examiners that could lead to the discrepancy within the difficulty levels of exam papers

Furthermore, to gain successful admission to secondary school entrance in Tonga, students must sit a Secondary Entrance Examination (SEE). The top secondary school in Tongatapu which is a government school has the highest cut-off of above 75% to gain school entrance: hence this school recruits the majority of the top students from all the islands of Tonga. This is the first choice of school for most parents and students because of its high standard and prestigious status. Students who fail admission to government schools tend to enrol in private schools mostly governed by various church bodies around the country.

Parental involvement was another factor with a significant direct and indirect link to students' academic performance. The study shows that a low rate of parental involvement in a child's schooling is directly associated with his/her low academic performance. This gives an indication that students with parents who are highly involved in their schooling perform better than students from a family with low parental involvement. This outcome is similar to findings of previous studies (Fan & Chen, 2001; Jeynes, 2007; Menaghan, 1996). According to Menaghan (1996), involving parents in school-related activities is one of the important factors affecting children's educational outcomes. Further, she discussed how across all types of family structure, a higher the level of parental involvement is significantly related to a child's successful academic outcome. Heynes (2007) reported that overall parental involvement is positively linked to educational achievement and the correlation in general holds across different types of families of children as well as across ethnicities. A report from Xitao Fan & Michael Chen (2001) indicated significant positive relationships *"between parental involvement*

and students' academic achievement". They explained that this associations is stronger with "*global achievement indicators (like school GPAs)"* than individual *"subject-specific indicators"* (like science grades). Additionally, the study found that parental involvement is one of the three most important drivers of academic performance.

I recommend that further study in Tonga is undertaken to better understand the complexities of family structures and parental involvement. Reflecting back on my own teaching experience, I recall that most of the students with parents who consistently visited schools to check on their students' performance found out the due dates and progress of their children's projects to monitor them from home. They also attended all the meetings and functions of the school. In turn, these students were the one with the most outstanding academic outcomes.

The result of this study also suggests that family structures have both direct and indirect negative effects on students' academic performance in Tonga. The results are consistent with some previous studies like for example, Astone & McLanahan (1991) and Nonoyama-Tarumi (2017). According to a study in the United States of America, Astone & McLanahan (1991) reported that growing up in a step-parent family and a single–parent family had similar negative effects on education attainment. Additionally from Japan, Nonoyama-Tarumi (2017) reported that his study showed negative association between family structures and children's academic outcomes. He explained that the negative associations remained even when a model to control low educational level of single parents was established. Furthermore, this study revealed that in Tonga, there is a significant amount of disparity that exists between the academic performance of students from traditional families and their counterparts from non-traditional families. It showed that students from traditional families performed better than those from non-traditional families. Other studies have similar results with different types of academic performances (Angel-Castillo & Torres-Herrera, 2008; Guidubaldi et al., 1986; Hampden-Thomson, 2009; McLanaha & Sandefur, 1994; Woessmmann, 2015; Yara & Tunde-Yara, 2010).

Angel-Castillo and Torres-Herrera (2008) reported that the dropout rates from school for Hispanic students almost doubled in students from non-traditional families *("single-parent or blended families"*) when compared to their counterparts in families with both parents. In a similar study, Hampden-Thomson (2009) reported on the relationships between family structures and the literacy achievement of students from two-parent families and those from

single-mother families. This international study of 12 countries showed significant differences. The United States of America escalated with the greatest variance. In elementary school students, Guidubaldi et al. (1986) indicated in a study an academic performance difference in the United States of America between students from traditional families and their counterparts from divorced families. The study illustrated that students from divorced families performed poorly compared to those from two-parent families in various aspects of life course such social and physical health and academic. Even adjusting to significant SES conditions, these differences remained. In a research for a long period of time (10 years), McLanaha and Sandefur (1994) had studied the possible harmful impacts of single parenting on children. They found an achievement difference existed between students from single-parent families and their counterparts from two-parent families. Woessmann (2015) used the data from the 2000 and 2012 Program for International Student Assessment (PISA) to study the link of family structures to children's academic achievement across 28 countries. The findings showed that students raised in single-parent families performed significantly lower in mathematics than those raised in two-parent families in almost all countries, particularly the United States of America. Research from Nigeria by Yara and Tunde-Yara (2010) further supports the existence of academic performance difference between students from one parent families and those from two-parent families.

According to this current study in Tonga, younger students perform better in their internal assessments (mid-year and final examinations) than the older students. During my 19 years of teaching and 9 years of being a deputy principal and the experiences in all the island groups in Tonga, one of the many possible reasons for this trend is that most of the senior students (Year 11, 12, and 13) who were requires to sit the national examinations (TSC, TSSC, TNFSC) were not dedicated and committed to achieving good grades in the internal assessment tasks. Their focus and drive were on the national examinations where they spent most of their time engaged in studying for this. In contrast, the younger students were more focussed on their internal assessments since their results would determine whether they moved up to the next level or repeat the same level in the following year.

The study also clearly demonstrated that family expectations play a significant role in the academic performance of secondary school students in Tonga. I found that more than half of the students with high family expectations achieved higher academic outcomes as compared to families with lower expectations. Similarly, Xitao (2001) reported the strong positive effect of

parents' educational aspirations on their children's academic growth. This effect outperformed that of SES and was consistent in all subject areas, sources of data and races. Fan and Chen (2001) reported that in comparison with parents' educational expectations and parental home supervision and the association with students' academic outcomes it was the parents' expectations that had the strongest affiliation with academic outcomes. Hossler and Stage (1992) suggested that high levels family expectation is another leading enabler of students' motivation to perform successfully at school. Additionally, Catsambis (2001) reported in a study of high school senior students, that of the variables academic achievement growth, completing high school with credits and being enrolled in the high school programs for extracurricular, it was parents' educational expectation that was most significant influential factor.

The study's findings also revealed that having a strong faith in the Christian Faith and GOD is one of the many reasons certain students performed better than others during their secondary school years. That is, students who grew up in families with a weak Christian faith in GOD performed poorly in comparison to those who were raised in families with a very strong Christian faith in GOD. Regrenus (2001) found a similar result as he mentioned in his book that with faith in GOD not only influenced students to stay at school but benefited their academic performance. In Tonga as a Christian nation, we do believe that Christian faith in GOD is very relevant in everyone's everyday life. Revealing that Christian faith in GOD influenced students to perform better academically in this finding is a strong-evidence that having genuine Christian faith in GOD is vital in one's daily life including one's academic life.

CHAPTER FIVE: CONCLUSIONS

5.1 Limitations

The study encountered a number of limitations worth noting. First of all, the study sample was drawn from the main island only, Tongatapu. It excluded the other main islands namely Vava'u, Ha'apai, 'Eua, Niuatoputapu and Niuafo'ou. Similarly, some schools within Tongatapu were excluded from the sampling frame. For example, boarding schools; single gender schools and those schools who did not grant me permission to conduct this study. These factors contributed to the biasness of selecting sample participants as students from the outer islands may have had totally different experiences compared to the selected students from Tongatapu. Students from boarding schools, single gender schools, or where permission was not granted may also have different experiences.

Secondly, due to the fact that two schools did not include their family structure in the student's profile for their administrative data, I otherwise directly obtained that information from students as clarified in chapter 2. I assumed students accurately classified their corresponding family structure as one of the following: solo-mother (birth out of wedlock), divorced parents, deceased parents (one or both), staying with relatives or friends. However, students may have submitted incorrect information which may have led to misleading outcomes. Moreover, with time limitations, I could not include parents in the survey and only assumed that the information from students were accurate.

In addition, the measurement of academic performance was not consistent for all participants. The internal assessment tasks were not consistent for all schools. Each school set their own examinations and students had different subjects in their options in addition to their core subjects (English, Mathematics, Science, Tongan Language).

Inappropriate timing of the interview was also identified as one of the limitations in the study. Most of the interviews were conducted after school. Some students were tired, had to catch the bus, to go for sport's training like netball and rugby while some were on punishment duty. Therefore, some student participants were not serious or available enough with their response. Again, there is a moderate possibility the study generated some inaccurate information. Finally, there are limitations in the process of data transcription.

5.2 Conclusion

This study has important implications in the potential to inform research on family influences on students' academic performance. According to the findings, certain conclusions were made in relation to the purpose of this study. Among its findings were the following:

i. School, parental involvement, family structure, age, family expectation and family Christian faith in GOD are the key drivers of students' academic performance.
ii. Family structure is associated with the academic performance of students, age 13 to 18, in secondary schools in Tonga. Significant differences were found between the academic performance of students from traditional families and those from non-traditional families, with students from traditional families performing better

School, parental involvement and family structure are the vital key drivers with both significant direct and indirect link to academic performance. In one of the analysis (***Figure 3.2.2e****-pp 40),* after the choice of school, parental involvement was the most influential variable. This can be seen as good news, regardless of family structure if parents spend time with their children and give them the sufficient amount of attention they need to succeed at school. As parents or guardians, we owe to our children our affection, time, attention, direction and correction. One question in the interview was asked asked, *"What are the main inputs from your parents that motivate you to study hard and to be successful?"* Given choices were (attention, money, resources, time), 83.6% selected time and attention, while 16.4% opted for money and resources. These outcomes do not mean that money and resources are not useful for education, they do matter, however, it means that success in education first of all, originates from the heart. In Tonga we say *"loto'aki"* (wholeheartedness, enthusiasm, eagerness, keenness). With *"loto'aki"* we can move mountains, we can clear wilderness and we can walk through oceans and cross the finish line! No matter how high our socio-economic, no matter how modern the resources we have, no matter how high standard and wealthy the school our children are studying at, no matter which family structure we are raised up at, without *"loto'aki"*, all the others are meaningless.

Sufficient and effective parental involvement is a clear visible image of love. *"Love never gives up, never loses faith, is always hopeful, and endures through every circumstance"* (1Corinthians 13: 7: New Living Translation). Love is powerful and it can give hope to any child from any particular family structure to be successful in any aspects of life including education. Lack of parental involvement reflects lack of love because it shows lack of concern for the development of their children. Without love, the child may feel lost, unimportant (has no values) and feels hopeless. As a result they ultimately give up on everything including their academic lives. Love is the building block to build *"loto'aki"* into the heart of our children and the seeds of love may take its root in the soil of adversities. Our children may not escape adversity but they may find the courage, enthusiasm, and strength to face it and still be successful.

5.3 Implications

A successful education is one of the strong and bold pillars that empower adolescents to overcome adversities that they face in life. It has the potential to give them allowance to know right from wrong and to be able to put together informed decisions to assist them to move forward in any circumstances and broadens their options for the future. The family has a vital role in developing the academic life of a child. Extensively, there is remarkable interest in the association between family structure and children's academic performance and achievement. Understanding this association is extremely crucial for designing specific and effective intervention strategies targeted at improving the achievements of children who suffer academically from any particular family structure. Therefore certain implications are put forward for consideration.

5.3.1 Implication for Parents

As parental involvement is one of the most influential drivers of academic performance, I am delighted to say that this finding should give all parents hope. It implies that the strength and type of relationship parents have with their children determines most of the well-being of their lives including academic lives. The last question for the interview was a sentence to complete; *"I wish that my parents/guardians …."* Here are some of the responses from the participants;

#1 *"I wish that my family would help me every time, especially this time when I am in form 5, and you know how projects and assessment are coming and I have been struggling, because it is not only one but all subjects (6) have its own projects, I am struggling, but then my father sometimes said he is busy with work and then I have to do it myself, type it, print it and all of those, I have to figure it out myself , but I really, really, really , really need help, my family help. They should support me and give me the support that I want from them, like for eg. always be there when I wanted them , I want them to attend PTA meetings and make time to listen and pay attention to all the school needs that I told them, so that I can improve in my study in order for me to help them in the future and also myself".*

#2 "I wish that both my parents would take some times with me because they are so busy with work. I just want them to let me know that they care – I need more attention."

#3 "I wish that my mom would sit down with me and look at my books one day and help me with my homework because that's rarely happens. And if she sits down with me, I think I can convey to her on how I think daily, because sometimes I think low of myself when I don't get attention from my mom because she is so busy with work and everything".

#4 *"I wish that my parents would support me, by encouraging me to go to school and attending church services and giving me advice and correct me if I done something wrong".*

#5*"I wish that my aunty will give me more space and time to do my study and complete all my homework. I wish that she would trust me and believe in me and let me follow my dream".*

Adolescents need help, attention, direction and discipline in all aspects of life from their family. Some advice from King Solomon; "*Direct your children onto the right path, and when they are older, they will not leave* it" (Proverb22.6: New Living Translation); "*To discipline a child, produces wisdom*" (Proverbs 29:15: New Living Translation). Learning is a pathway to wisdom therefore a kind and positive discipline helps our young generation learn. Level and type of parental involvement are very important in the development of a child's academic life. Family structure is another vital driver of academic performance. Therefore, disruptions in the structure of families should not be taken lightly because they can cause many damages especially in children's lives including their academic lives. Finally, Christian faith in GOD has also has an impact on the academic lives of our children as revealed by the study. No one born with Christianity, but with encouragement, training, direction and firm discipline will lead them to have hope and trust in the LORD.

As King Solomon advised; *"Trust in the LORD with all your heart; do not depend on your own understanding. Seek his will in all you do, and he will show you which path to take*."

(Proverb3:5 -6: New Living Translation)

5.3.2 Implications for Educators

School stood out as the main key driver of academic performance in the study. This finding is a reminder to the educators of their vital role in connecting students to their academic lives. What is lacking at home, educators should make it their goal to bridge that gap. Dealing with many students from different family backgrounds is not an easy task. However, with GOD, "*everything is possible*" (Matthew19: 26: New Living Translation).

With best practices, purposefully actions and effective intervention strategies we can buffer the academic gaps and make sure that there is no child left behind. Each student has a natural fondness to learning that we can help develop. Parents' involvement has a significant effect on the academic outcome of the students. In talking and working together with parents, we can better discern and develop the individual capabilities of each student. Therefore consistent interaction and communication between parents and educators are strongly recommended.

5.3.3 Implications for Government

The findings of the study remind the Kingdom of Tonga that, **"***The children of today will be the nation of tomorrow***"** and the family has the most vital role as primary builders. If we want a better, prosperous and stable tomorrow for the society of Tonga, we should invest in our children of today.

In Tongan we say, "Ikai ke 'i ai ha to'a te ne lava 'o tu'u tokotaha"-("No warrior can fight alone"). With regards to the findings and discussions of this study, I can say that it takes a whole society to help build and mould a child. Whether we are school administrators, educators, support staff, parents or guardians we owe it to our young generations: to assist, to direct, to discipline, to encourage, to train, to monitor, to walk with them hand in hand. Also to guide and give them the emotional strength they need to face their future in any circumstances and otherwise flourish and thrive in life.

5.3.4 Implications for further studies

There is an imperative need for further research in the area of family structure as it relates to academic performance. Future study needs to focus on a common assessment for all schools and each type of family structure. It would be very interesting to examine the effects of multiple subcategories of family structures (single-parent including by death, divorce, solo-mother and two-parent – subdivided to working parents and non-working parents) on academic performance instead of just one category like in this study (as traditional, and non-traditional). For example, to examine the association of divorce family structure with academic performance or solo-mother with academic performance or traditional family (with working parent(s)) with academic performance or traditional family (not working parent(s)) with academic performance.

Similarly, further study should be conducted to examine the relationship between parental involvement and academic performance. The research should take into account different types of parental involvements and involvement at home as well as involvement at school. This will help identify which forms or types of parental involvement are more functional and effective.

Since family structure and parental involvement are correlated, it is important to conduct a study a follow up study to explore the relationships between them. This should take into account the different types of parental involvements among family structures and explore whether the relationship between parental involvement and academic performance depends on family structure context.

Additionally, further longitudinal study on the same issue should be conducted to a target group of students. For example, new recruits (first year in secondary school level- Year 7) as the target group, then follow them up until they graduate from secondary school (Year 13). This will give an allowance for the analysis to; (i) Identify, which family structure has the most influence on academic performance (ii). Keep track of the changes in the students' academic performance as they take place (iii). Explore how long it will take for family structures to breakdown form these negative effects.

Moreover, because this study used secondary schools in the main island only (Tongatapu), further research is needed to explore the problem across Tonga including the outer islands (since 11 secondary schools of 23 are at the outer islands); and across all school types, so that its result become valid for the whole of Tonga.

Finally, since school is the most key driver of academic performance in this study, there is a great need for a further follow up study to explore the depth of this relationship. This will help the analysis phase to identify the various reasons why differences exist in the academic performance amongst schools. Then, associations between schools can be emphasized to share skills and experiences and the different strategies for intervention plans which will improve outcomes for all students in all schools in Tonga.

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Appendices

Appendix1: Supplementary Material

Academic Performance

Students in each level take different numbers of subjects. For example level 1, 2, 3 and 4 take 7 subjects, level 5 take 6 subjects and level 6 and 7 take 5 subjects. Seven subjects for level 1 and 2 are all compulsory. They are English, Mathematics, Tongan Language, Science, Creative Technology (CT), Tonga Society and Culture (TSC) and Movement and Fitness (MFT). Level 3 and 4 students takes 4 compulsory subjects ; English, Mathematics, Science and Tongan languages and they have to choose three optional subjects from [Accounting, Economics, Computer Studies, Agricultural Science, Design Technology, History, Geography, and Japanese language, Chinese language and French language] to make up the 7 subjects. The compulsory subjects for Level 5 are same as level 4 and plus two optional subjects from (Biology, Geography, History, Accounting, Economics, Japanese language, Chinese language , French language, Agricultural Science, Design Technology and Computer Studies). Level 6 has only one compulsory subject which is English and they have to choose 4 optional subjects from the same list for form 5 including Physics and Chemistry. There is no compulsory subject for Year 13 (Level 7). They have to choose 5 optional subjects from the same list in form 6 including Tourism and Hospitality (TH), Mathematics with Statistics (MS) and Mathematics with Calculus (MC). Few schools have added few subjects to their list like Biblical Studies (BS), Development Studies (DS) and Graft and Arts (GA).

Family Socio-Economic Status (SES)

SES was defined using students' responses to the following questions.

Education **-** Education of either wife or husband or guardians (the most educated)

What is your parents/guardian's level of education? Primary, secondary, Post Secondary, none

Any other ……..

i. University - 7 ii. Post Secondary - 5 iii. Secondary - 3 iv. Primary - 1 v. None – 0

Family Financial Status

What are your family's main sources of income? (can select more than one)
(Monthly salary, loan, selling farm outputs, small business, others); If other, please specify
Monthly per capita income from all sources.

i. > 50,000 – **7** ii. 20,000 – 49999 – **6** iii. 10,000 – 19,999 – **5** iv. 5000- 9999 - **3**

v. 2500 – 4999 – **2** vi. < 2500 - **1**

Occupation (husband, otherwise wife / guardians)
What are your parents' / guardians' occupations?

i. Civil services (doctors, teachers, administrative etc)-**7**
ii. Service at shops, home, transport, own cultivation of land – **5**
iii. Self-employed eg. shops, or petty business – **3**
iv. Self-employed (labourer, housewife) – **1**
v. None of the family member is employ - **0**

Sum of all scores for Parents' education and occupation and family main sources of income is 21

High level = total score ≥ 21 – (25% of 21)
Medium = between high and low
Low level = total score ≤ 25% of 21

Table App1.a. Scoring system for Socio-Economic Status (SES)

Socio-Economic Status(SES)	Score
High	≥ 16
Medium	6 – 15
Low	≤ 5

Parental Involvement

i. How often do your parents/guardians do each of the following?
(Never, Hardly ever, sometimes, often)

Statement	Never (0)	Hardly Ever (1)	Sometimes (3)	Often (5)
Help with your homework after school				
Make sure you do your homework / assignment				
Talk with you about how you can improve your school work?				
Talk with your teachers about how you are doing at school.				
Talk with you about why school subjects are important in the real world.				
Talk with you about different careers that you can have				
Talk with you about how you are getting along with teachers.				
Ask or Pay for extra tutor to help you after hours				

ii. Read carefully the following statements and choose the appropriate option. (SA – Strongly Agreee),
(A – agree), (D – Disagree), (SD – strongly disagree.)

Statement	S.A (5)	A (3)	D (1)	SD (0)
My parents reward and give me positive remarks about my academics				
I am always free to discuss my academics with my parents since they are always approachable for intellectual assistance.				
My parents are quite committed and self-sacrificing in their work and encourage me to work hard in my academics				
My parents take an active role involving themselves to my academic requirements.				
Sometimes my parents/guardians assign me some school based tasks and give feedback in time.				
My parents/guardians show a positive attitude towards my school's teaching/learning process.				
My parents/guardians are really a source of academic inspiration and motivation.				

Table App1.b. Scoring system for Parental Involvement

Parental Involvement	Score
High	≥ 7
Medium	4 – 6
Low	≤ 3

High level = 10 – 25% of 10

Medium level = between high and low

Low level = 25% of 10

Family Expectation

What is your expectation?

What is your parents/guardians expectation? (Highest expectation)

Doctors, Lawyers, Pilot etc – **7**

(any career – which leads to attending universities)

Teachers, Nurse, police officer, soldier

(any career –earn without going to universities) - **5**

Others (sport, carpenter, clerk, etc) - **3**

Table App1.c. Scoring system for Family Expectation

Parental Involvement	Score
High	7
Medium	5
Low	3

Appendix 2 : Population and Crude Rates per 10,000 people

Table app2.a **:** Information about Divorce and Solo Mother .

Year	No. of filed divorce per year	Total population	Crude Rate per 10,000 people	No. of Solo Mother per year	Crude Rate per 10,000 people
1993	81	96,844	8.36	Yet to receive this data	
1994	75	97,157	7.72		
1995	63	97,471	6.46		
1996	81	97,784	8.28		
1997	66	98,205	6.72		
1998	86	98,625	8.72		
1999	91	99,046	9.19		
2000	113	99,467	11.36	244	24.5
2001	89	99,888	8.91		
2010	148	104,137	14.21	337	32.4
2011	166	104,577	15.87		
2012	155	104,951	14.77		
2013	148	105,328	14.05		
2014	169	105,782	15.98		
2015	204	106,364	19.18		
2016	221	107,122	20.63		
2017 -					
1993 – 1999	**543**	**685,131**	**7.93**		
2010 – 2016	**1211**	**738,261**	**16.4**		

Appendix 3 ETHIC APPROVAL

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

HUMAN ETHICS COMMITTEE

Secretary, Rebecca Robinson
Telephone: +64 03 369 4588, Extn 94588
Email: human-ethics@canterbury.ac.nz

Ref: 2017/20/ERHEC

9 May 2017

Losana Vao Latu Latu
School of Mathematics and Statistics
UNIVERSITY OF CANTERBURY

Dear Losana

Thank you for providing the revised documents in support of your application to the Educational Research Human Ethics Committee. I am very pleased to inform you that your research proposal **"**Linkage of Family Structure and Academic Achievements of High School Students in Tonga: a Comparative Study of the Academic Achievement of Students from Traditional Families and Those From Non-traditional Families" has been granted ethical approval.

Please note that this approval is subject to the incorporation of the amendments you have provided in your email of 4th May 2017.

Should circumstances relevant to this current application change you are required to reapply for ethical approval.

If you have any questions regarding this approval, please let me know.

We wish you well for your research.

Yours sincerely

pp R. Robinson

Dr Patrick Shepherd
Chair
Educational Research Human Ethics Committee

Please note that ethical approval relates only to the ethical elements of the relationship between the researcher, research participants and other stakeholders. The granting of approval by the Educational Research Human Ethics Committee should not be interpreted as comment on the methodology, legality, value or any other matters relating to this research.

F E S

Appendix 4 LETTERS

Appendix 4.1 Letter to the Minister of Education in Tonga (Chairperson for the Scholarship Committee)

Mathematics and Statistics Department
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Losana Vao Latu Latu
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UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Hon. Penisimani 'Epenisa Fifita,
Ministry of Education and Training,
Nuku'alofa, Tonga .
12/04/2017.

Dear Hon. Minister of Education and Training,

Praises be to GOD for all HIS loves and many blessings that HE bestows upon us all. I hope this letter finds you well as we are in the fourth month of this academic year. It is my delight to extend my sincere gratitude for the Tongan Government funded scholarship which has enabled me to pursue a Master of Science in Statistics at the University of Canterbury in Christchurch, New Zealand.

As the second part of the MSc program, I am to produce a Master Thesis on any field of interest for one year period. I plan to do my research on the possible link of family structure to the academic achievements of high school students age 13 to 18 in Tonga. This is a comparative study of the academic achievements between high school students from a traditional family and those from a non-traditional family.

I would like to humbly submit a request to the Scholarship Committee for Postgraduate research allowance that would cover the cost of my airfare tickets (return) to Tonga from Christchurch and as well as airfare tickets to Vava'u, Ha'apai and 'Eua. Please find attached a supporting letter from my senior supervisor, Professor. Jennifer Brown, and a brief description of the study. If the Scholarship committee sees fit to grant my request for research funding, it would be best to undertake this data collection in Tonga from the 1st of May till 2nd of June.

Thank you once again for the continued financial support and for considering this request. I look forward to the response of the Scholarship Committee and pray that the LORD continue to guide the Ministry of Education and Training as it leads the next generation to pursue knowledge and excellence in Tonga.

Yours faithfully,

Losana Vao Latu Latu.

Appendix 4.2 Letter to the Director of Education in Tonga

Mathematics and Statistics Department
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Losana Vao Latu Latu
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Email: sanavao.leo@gmail.com

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

To, Mr. Koloti Tupou,
Chief Executive Officer,
Ministry of Education and Training - MET
Nuku'alofa,Tonga.
19th – April – 2017.

Dear Sir,

Praise GOD for all HIS loves and many blessings. I hope this letter finds you well as we are in the fourth month of this academic year. It is my delight to extend my sincere gratitude to the Ministry of Education and Training for granting me with the study leave to pursue my Master in Science in the University of Canterbury in Christchurch, New Zealand.

I am to undertake a research on the possible link between the family structure and academic achievement of high school students age 13 to 18 in Tonga. This will be a comparative study of the academic achievements between students from traditional families and those from non-traditional families. The study will involve 8 high schools; four from Tongatapu and four from the outer Islands; 2- Vava'u, 1- Ha'apai and 1- 'Eua. 30 students will be selected randomly from each school which will make up a 240 participants.

I would like to humbly seek your permission to conduct my research using students from the selected high schools. I am planning to come to Tonga in the month of May to collect the data from the schools' administrative data as well as interviewing the selected students. Please find enclosed an information sheet, a consent form and a letter of support from my senior supervisor, Professor Jennifer Brown.

Thank you once again for every support and for considering this request. I look forward to your response and pray that the Good LORD continues to guide the Ministry of Education and Training as it leads the next generation to pursue knowledge and excellent in Tonga.

Yours faithfully,

Losana Vao Latu Latu

Appendix 4.3 **Letters to the Directors of Education (for Private Schools Education Systems)**

Mathematics and Statistics Department
Telephone : +64302102313804
Losana Vao Latu Latu
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Email: sanavao.leo@gmail.com

To, Mr. Savelio 'Atuekaho,
Director of Education,
Church of Tonga Education System,
Nuku'alofa,Tonga.
2nd – May – 2017.

Dear Sir,
Praise GOD for all HIS loves and many blessings. I hope this letter finds you well as we are in the fourth month of this academic year. I am Losana Vao Latu Latu a Master student at the University of Canterbury.

I am undertaking a research on the possible link between family structure and academic achievement of high school students age 13 to 18 in Tonga. The study will involve 8 high schools and I have selected Tailulu College (Tongatapu) as one of my target schools. I would like to humbly seek your permission to conduct my research including 30 students from Tailulu College. Please find attached a brief description of the study.

The University of Canterbury's Educational Research Human Ethics Committee (ERHEC) is reviewing my Ethic Application. When I get their approval, I will send the information sheet and a consent form as soon as possible.

Thank you once again for considering this request. I look forward to your response and pray that the Good LORD continues to guide the Church of Tonga Education System as it assists in leading the next generation to pursue knowledge and excellent in Tonga.

Yours faithfully,

Losana Vao Latu Latu.

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UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

To, Dr. Rev. Mele'ana Puloka,
President of Education,
Free Weslyan Church Education System,
Nuku'alofa,Tonga.
20th – April – 2017.

Dear Madam,

Praise GOD for all HIS loves and many blessings. I hope this letter finds you well as we are in the fourth month of this academic year. I am Losana Vao Latu Latu a Master student at the University of Canterbury.I am undertaking a research on the possible link between family structure and academic achievement of high school students age 13 to 18 in Tonga.

The study will involve 8 high schools and I have selected Tupou High School (Vaololoa) as one of my target school. I would like to humbly seek your permission to conduct my research including 30 students from Tupou High School. Please find attached a brief description of the study.

The University of Canterbury's Educational Research Human Ethics Committee (ERHEC) will review my Ethic Application on the 26th – Wednesday next week. When I get their approval, I will send the information sheet and a consent form as soon as possible.

Thank you once again for considering this request. I look forward to your response and pray that the Good LORD continues to guide the Free Weslyan Church Education System as it assists in leading the next generation to pursue knowledge and excellent in Tonga.

Yours faithfully,

Losana Vao Latu Latu.

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UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

To, Mrs. Lutimila 'Ahokovi,
Human Resource Manager,
LDS Education System,
Tonga.
8th – May – 2017.

Dear Madam,

Praise GOD for all HIS loves and many blessings. I hope this letter finds you well as we are in the fifth month of this academic year. I am Losana Vao Latu Latu a Master student at the University of Canterbury. I am undertaking a research on the possible link between family structure and academic achievement of high school students age 13 to 18 in Tonga.

The study will involve 8 high schools and I have selected Saineha High School (Vava'u) as one of my target school. I would like to humbly seek your permission to conduct my research including 30 students from Saineha High School. Please find attached a brief description of the study.

I am currently awaiting the approval from the University of Canterbury's Educational Research Human Ethics Committee (ERHEC). When I get their approval, I will send the information sheet and a consent form as soon as possible, to the Principal of Saineha if I get your approval too. I have already had the permission from the Director of Education – Mr. Claude Tupou to do this study in Tonga.

Thank you once again for considering this request. I look forward to your response and pray that the Good LORD continues to guide the LDS Education System as it assists in leading the next generation to pursue knowledge and excellent in Tonga.

Yours faithfully,

Losana Vao Latu Latu.

Appendix 4.3 A sample of the letter to the Principals (Participants Secondary School)

Mathematics and Statistics Department
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UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

To, Mr. XXXXXXXX,
Principal,
XXXXXXXXX High School,
Tonga.
16th – May – 2017.

Dear Sir,

Praise GOD for all HIS loves and many blessings. I hope this letter finds you well as we are in the fifth month of this academic year. I am Losana Vao Latu Latu a Master student at the University of Canterbury. I am undertaking a research on the possible association between family structure and academic achievement of high school students age 13 to 18 in Tonga.

The study will involve 11 high schools and I have selected XXXXX High School as one of my target school. I would like to humbly seek your permission to conduct my research including 60 students from XXXXX High School.

I have already had the permission from the Director of Education – Mr. Claude Tupou to do this study in Tonga.

Thank you once again for considering this request. I look forward to your response and pray that the Good LORD continues to guide the XXXXXX Education System as it assists in leading the next generation to pursue knowledge and excellent in Tonga.

Yours faithfully,

Losana Vao Latu Latu.

Appendix 5: Information sheets and Consent forms

INFORMATION SHEET- DIRECTOR OF EDUCATION

Mathematics and Statistics Department
Telephone : +64302102313804
Date : 28/03/2017

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Linkage of family structure to the academic achievements of high school students in Tonga.

A comparative study of academic achievements of high school students from traditional families and those from non-traditional families.

Information sheet for the Chief Executive Officer (Ministry of Education and Training)

Malo e Lelei

I am Losana Vao Latu Latu, a Master student at the University of Canterbury. I am undertaking a research on the possible link between family structure and academic achievement of high school students age 13 to 18 in Tonga.

Brief description of the study

Purpose

To quantify the link between family structure and academic achievements of high school students in Tonga.

Objective

To identify whether there is a significance difference between the academic achievements of high school students from a traditional family and those from a non-traditional family.

Definition:

Traditional family: - family made up of a married biological parents or married adoptive parents

Non – Traditional family: - family made up of a single parent (by birth(solo), divorce, death), unmarried biological parents or unmarried adoptive parents, staying with relatives /friends(no parents)

Participants

Out of the 23 high schools, eight will be selected to be under studied. Four from the main island, Tongatapu and 4 from the outer islands; Vava'u, Ha'apai and 'Eua. The Niuas are excluded due to logistical constraints with the flights availability. The eight high schools consist of 4 Government schools and 4 Mission schools. 30 students will be selected from each high school; fifteen from each type of family structure.

Importance of the study

Everyone wants improvement in the academic achievements of their children. For effective decision making and intervention planning, guidelines based on solid evidences must be in place. The intention of this study is to assist in providing guidelines for school administrators, parents and Government by identifying effective support for family structure that will improve academic achievements.

If you agree to conduct this study in the eight selected schools, information sheet and consent form will be sent immediately to the schools' principals. The school will be included in the study if the principal agree, if not another school will be approached. Currently, I have selected Tonga High School, Tupou High School, Tailulu College (Tongatapu), Takuilau, Vava'u High School, Saineha High School, Ha'apai High School and 'Eua High School. Data will be retrieved from the schools administrative data like age and academic achievements and from a personal interview with the chosen students. The interview will be audio recorded and will take at most 10 minutes for each student. Information sheet and a consent form will be provided for the selected students and their parents. The students will be included in the study if their parents agree. If approval cannot be gained for a student, another student will be included as a replacement (assuming approval will be gained for this student).

The risks of participating in this study may be the students will face some sensitive questions however they will be informed that they have every right to refuse to answer any questions that they do not wish to answer. If they feel uncomfortable or distress to be interviewed alone, they can choose anyone to accompany them during the interview (either, one of the parents, principals, senior tutor/mistress or anyone they prefer).

Participation is voluntary and the students have the right to withdraw from the project at any time. If they choose to withdraw, I will use my best endeavours to remove any of the information relating to them from the project, including any final publication, provided that this remains practically achievable.
The results of the project may be published, but the students may be assured of the complete confidentiality of data gathered in this investigation: the students' identities and schools identities will not be made public without their prior consent. To ensure anonymity and confidentiality, all data will be stored on a secure research server within the School of Mathematics and Statistics. No identifiable information will be stored on the server, such as names, and instead anonymous ID's will be used. No one will access to the data except me and my supervisors. The data will be destroyed after 5 years from now. For your information a thesis is a public document and will be available through the University of Canterbury Library.

The project is being carried out as a requirement for a Master Thesis in Science in the field of Statistics by Losana Vao Latu Latu under the supervision of Professor Jennifer Brown and Dr. Jacki Henderson, who can be contacted at jennifer.brown@canterbury.ac.nz and jacki.henderson@canterbury.ac.nz . They will be pleased to discuss any concern you may have about the schools' participation in the project.

This project has been reviewed and approved by the University of Canterbury Educational Research Human Ethics Committee, and participants should address any complaints to The Chair, Educational Research Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch: humanethics@canterbury.ac.nz.
If you agree for this study to be undertaken using the high schools in Tonga, you are asked to please complete the consent form and send it through email to myself at sanavao.leo@gmail.com.

Malo 'aupito

Losana Vao latu Latu

CONSENT FORM – DIRECTOR OF EDUCATION

Mathematics and Statistics Department
Telephone : +64302102313804
Date : 28/03/2017

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Linkage of family structure to the academic achievements of high school students in Tonga.

A comparative study of academic achievements between high school students from traditional families and those from non-traditional families.

Consent form for the Chief Executive Officer (Ministry of Education and Training)

Please place a tick ☑ inside the appropriate boxes.

- □ I have been given a full explanation of this project and have had the opportunity to ask questions.
- □ I understand what is required of the students if I agree for them to take part in the research.
- □ I understand that participation is voluntary and the students can withdraw at any time without penalty. Withdrawal of participation will also include the withdrawal of any information they have provided should this remain practically achievable.
- □ I understand that any information or opinions the students provide will be kept confidential to the researcher and her supervisors and that any published or reported results will not identify the participants and the schools. I understand that a thesis is a public document and will be available through the University of Canterbury Library in Christchurch New Zealand.
- □ I understand that all data collected for the study will be kept in locked and secure facilities and/or in password protected electronic form and will be destroyed after 5 years.
- □ I understand the risks associated with taking part and how they will be managed.
- □ I understand that I am able to receive a report on the findings of the study by contacting the researcher at the conclusion of the project.
- □ I understand that I can contact the researcher Losana Vao Latu Latu at sanavao.leo@gmail.com or supervisors; Professor Jennifer Brown (jennifer.brown@canterbury.ac.nz) or Dr. Jacki Henderson (jacki.henderson@canterbury.ac.nz) for further information. If I have any complaints, I can contact the Chair of the University of Canterbury Educational Research Human Ethics Committee, Private Bag 4800, Christchurch (humanethics@canterbury.ac.nz)
- □ I would like a summary of the results of the project.
- □ By signing below, I agree for this study to be conducted using high schools in Tonga.

Name: ..... Signed:..... Date:.....

Email address (for report of findings, if applicable): .....

Please after completing the consent form send it through email to myself at sanavao.leo@gmail.com as soon as possible so that I will have enough time to seek permission from the selected schools or find a replacement if approval is not granted.

Malo ‘aupito.
Losana Vao Latu Latu

SIGNED CONSENT FORM – DIRECTOR OF EDUCATION (CEO)

Mathematics and Statistics Department
Telephone : +643021023138O4
Date :19/04/2017

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Linkage of family structure to the academic achievements of high school students in Tonga.
A comparative study of academic achievements between high school students from traditional families and those from non-traditional families.

Consent form for the Chief Executive Officer (Ministry of Education and Training)

Please place a tick ☑ inside the appropriate boxes.

- ☑ I have been given a full explanation of this project and have had the opportunity to ask questions.
- ☑ I understand what is required of the students if I agree for them to take part in the research.
- ☑ I understand that participation is voluntary and the students can withdraw at any time without penalty. Withdrawal of participation will also include the withdrawal of any information they have provided should this remain practically achievable.
- ☑ I understand that any information or opinions the students provide will be kept confidential to the researcher and her supervisors and that any published or reported results will not identify the participants and the schools. I understand that a thesis is a public document and will be available through the University of Canterbury Library in Christchurch New Zealand.
- ☑ I understand that all data collected for the study will be kept in locked and secure facilities and/or in password protected electronic form and will be destroyed after 5 years.
- ☑ I understand the risks associated with taking part and how they will be managed.
- ☑ I understand that I am able to receive a report on the findings of the study by contacting the researcher at the conclusion of the project.
- ☑ I understand that I can contact the researcher Losana Vao Latu Latu at sanavao.leo@gmail.com or supervisors; Professor Jennifer Brown (jennifer.brown@canterbury.ac.nz) or Dr. Jacki Henderson (jacki.henderson@canterbury.ac.nz) for further information. If I have any complaints, I can contact the Chair of the University of Canterbury Educational Research Human Ethics Committee, Private Bag 4800, Christchurch (humanethics@canterbury.ac.nz)
- ☑ I would like a summary of the results of the project.
- ☑ By signing below, I agree for this study to be conducted using high schools in Tonga.

Name: CLAUDE TUPOU Signed: Date: 19/04/17

Email address (for report of findings, if applicable): claudetupou@gmail.com

MINISTRY OF EDUCATION AND TRAINING TONGA

Please after completing the consent form send it through email to sanavao.leo@gmail.com as soon as possible so that I will have enough time to seek permission from the selected schools or find a replacement if approval is not granted.

Malo 'aupito.
Losana Vao Latu Latu

INFORMATION SHEET SCHOOLS' PRINCIPALS

Mathematics and Statistics Department
Telephone : +64302102313804
Date : 10/05/2017

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Linkage of family structure to the academic achievements of high school students in Tonga.

A comparative study of academic achievements of high school students from traditional families and those from non-traditional families.

Information sheet –School Principal

Malo e Lelei

I am Losana Vao Latu Latu, a Master student at the University of Canterbury. I am undertaking a research on the possible association between family structure and academic achievement of high school students age 13 to 18 in Tonga.

Brief description of the study

Purpose

To quantify the association between family structure and academic achievements of high school students in Tonga.

Objective

To identify whether there is a significance difference in the academic achievements of high school students from a traditional family and those from a non-traditional family.

Definition:

Traditional family: - family made up of a married biological parents or married adoptive parents

Non – Traditional family: - family made up of a single parent (by birth(solo), divorce, death), unmarried biological parents or unmarried adoptive parents, staying with relatives /friends(no parents)

Importance of the study

Everyone wants improvement in the academic achievements of their children. For effective decision making and intervention planning, guidelines based on solid evidences must be in place. The intention of this study is to assist in providing guidelines for school administrators, parents and Government by identifying effective support for family structure that will improve academic achievements.

If you choose to include your school in this study, 30 students will be randomly selected; fifteen from each type of family structure. Data will be retrieved from your administrative data like age and academic achievements and from a personal interview with the chosen students. The interview will be audio recorded and will take at most 10 minutes for each student. An information sheet and a consent form will be provided for the parents of the 30 students. The students will be included in the study if their parents agree. If approval cannot be gained for a student, another student will be included as a replacement.

The risks of participating in this study may be the students will face some sensitive questions however they will be informed that they have every right to refuse to answer any questions that they do not wish to answer. If they feel uncomfortable or distress to be interviewed alone, they can choose anyone to accompany them during the interview (either, one of the parents, senior tutor/mistress or anyone they prefer.

Participation is voluntary and the students have the right to withdraw from the project at any time. If they choose to withdraw, I will use my best endeavours to remove any of the information relating to them from the project, including any final publication, provided that this remains practically achievable.

The results of the project may be published, but you may be assured of the complete confidentiality of data gathered in this investigation: your students' identities and school identity will not be made public without your prior consent. To ensure anonymity and confidentiality, all data will be stored on a secure research server within the School of Mathematics and Statistics. No identifiable information will be stored on the server, such as names, and instead anonymous ID's will be used. No one will access to the data except me and my supervisors. The data will be destroyed after 5 years from now. For your information a thesis is a public document and will be available through the University of Canterbury Library in Christchurch New Zealand.

The project is being carried out as a requirement for a Master Thesis in Science by Losana Vao Latu Latu under the supervision of Professor Jennifer Brown and Dr. Jacki Henderson, who can be contacted at jennifer.brown@canterbury.ac.nz and jacki.henderson@canterbury.ac.nz . They will be pleased to discuss any concern you may have about your school participation in the project.

This project has been reviewed and approved by the University of Canterbury Educational Research Human Ethics Committee, and participants should address any complaints to The Chair, Educational Research Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch: humanethics@canterbury.ac.nz.

If you agree for your school to participate in the study, you are asked to please complete the consent form and send it through email to sanavao.leo@gmail.com .

Malo 'aupito

Losana Vao latu Latu

CONSENT FORM – SCHOOLS' PRINCIPALS

Mathematics and Statistics Department
Telephone : +64302102313804
Date : 19/04/2017

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Family structure and academic achievements of high school students in Tonga.

A comparative study of academic achievements of high school students from traditional families and those from non-traditional families.

Consent form – School Principal

Please place a tick ☑ inside the appropriate boxes.

□ I have been given a full explanation of this project and have had the opportunity to ask questions.
□ I understand what is required of my students if I agree for them to take part in the research.
□ I understand that participation is voluntary and my students can withdraw at any time without penalty. Withdrawal of participation will also include the withdrawal of any information they have provided should this remain practically achievable.

□ I understand that any information or opinions my students provide will be kept confidential to the researcher and her supervisors and that any published or reported results will not identify the participants and the school. I understand that a thesis is a public document and will be available through the University of Canterbury Library in Christchurch New Zealand.

□ I understand that all data collected for the study will be kept in locked and secure facilities and/or in password protected electronic form and will be destroyed after 5 years.
□ I understand the risks associated with taking part and how they will be managed.
□ I understand that I am able to receive a report on the findings of the study by contacting the researcher at the conclusion of the project.

□ I understand that I can contact the researcher Losana Vao Latu Latu at sanavao.leo@gmail.com or supervisors; Professor Jennifer Brown (jennifer.brown@canterbury.ac.nz) or Dr. Jacki Henderson (jacki.henderson@canterbury.ac.nz) for further information. If I have any complaints, I can contact the Chair of the University of Canterbury Educational Research Human Ethics Committee, Private Bag 4800, Christchurch (humanethics@canterbury.ac.nz)

□ I would like a summary of the results of the project.

□ By signing below, I agree for …… (name of the school)to participate in this research project.

Name: …… Signed:…… Date:……

Email address (for report of findings, if applicable): ……

Please after completing the consent form send it through email to sanavao.leo@gmail.com as soon as possible so that I will have enough time to seek for another school if you do not agree to include your school in this study.

Malo 'aupito.

Losana Vao Latu Latu

INFORMATION SHEET FOR PARENTS

Mathematics and Statistics Department
Telephone : +64302102313804
Date : 17/05/2017

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Family structure and academic achievements of high school students in Tonga.

A comparative study of academic achievements of high school students from traditional families and those from non-traditional families.

Information sheet for the participant's parents

Malo e Lelei

I am Losana Vao Latu Latu, a Master student at the University of Canterbury. I am here undertaking a research on the possible association between family structure and academic achievement of high school students age 13 to 18.

Brief description of the study

Purpose

To quantify the association between family structure and academic achievements of high school students in Tonga.

Objective

To identify whether there is a significance difference in the academic achievements of high school students from a traditional family and those from a non-traditional family.

Definition:

Traditional family: - family made up of a married biological parents or married adoptive parents

Non – Traditional family: - family made up of a single parent (by birth(solo), divorce, death), unmarried biological parents or unmarried adoptive parents, staying with relatives /friends(no parents)

Importance of the study

Everyone wants improvement in the academic achievements of their children. For effective decision making and intervention planning, guidelines based on solid evidences must be in place. The intention of this study is to assist in providing guidelines for school administrators, parents and Government by identifying effective support for family structure that will improve academic achievements.

If you agree for your child to participate in this study, he/she will be interviewed by the researcher (myself) and you will be informed before hand of the date for the interview. The range of topics that will

be discussed during the interview are ; parents' involvement, Social Economics Status, Religious Status, daily time spend at home on studying, family/students expectation. The interview will be audio recorded and it will take at most 10 minutes. If you have any further questions please called me at 8822779 or email; sanavao.leo@gmail.com. As a follow-up to this investigation, you will be asked to provide your phone number and email address.

The risks of participating in this study may be the students will face some sensitive questions however they will be informed that they have every right to refuse to answer any questions that they do not wish to answer. If they feel uncomfortable or distress to be interviewed alone, they can choose anyone to accompany them during the interview (either, yourself, principal, senior tutor/mistress or anyone they prefer).

Participation is voluntary and your child has the right to withdraw from the project at any time without penalty. If she/he chooses to withdraw, I will use my best endeavours to remove any of the information relating to him/her from the project, including any final publication, provided that this remains practically achievable.

The results of the project may be published, but you may be assured of the complete confidentiality of data gathered in this investigation: your child identity will not be made public without your prior consent. To ensure anonymity and confidentiality, all data will be stored on a secure research server within the School of Mathematics and Statistics. No identifiable information will be stored on the server, such as names, and instead anonymous ID's will be used. No one will access to the data except me and my supervisors. The data will be destroyed after 5 years from now. For your information a thesis is a public document and will be available through the University of Canterbury Library.

The project is being carried out as a requirement for a Master Thesis in Science by Losana Vao Latu Latu under the supervision of Professor Jennifer Brown and Dr. Jacki Henderson, who can be contacted at jennifer.brown@canterbury.ac.nz and jacki.henderson@canterbury.ac.nz . They will be pleased to discuss any concern you may have about your child participation in the project.

This project has been reviewed and approved by the University of Canterbury Educational Research Human Ethics Committee, and participants should address any complaints to The Chair, Educational Research Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch: humanethics@canterbury.ac.nz.

If you agree to participate in the study, you are asked to complete the consent form and send it to the principal or deputy principal.

Malo 'aupito

Losana Vao latu Latu

CONSENT FORM FOR PARENTS

Mathematics and Statistics Department
Telephone : +64302102313804
Date : 17/05/2017

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Family structure and academic achievements of high school students in Tonga.

A comparative study of academic achievements of high school students from traditional families and those from non-traditional families.

Consent form for the participant's parents

Please place a tick ☑ inside the appropriate boxes.

□ I have been given a full explanation of this project and have had the opportunity to ask questions.

□ I understand what is required of my child if I agree for her/him to take part in the research.

□ I understand that participation is voluntary and my child may withdraw at any time without penalty. Withdrawal of participation will also include the withdrawal of any information my child has provided should this remain practically achievable.

□ I understand that any information or opinions my child provides will be kept confidential to the researcher and her supervisors and that any published or reported results will not identify my child or his/her school. I understand that a thesis is a public document and will be available through the University of Canterbury in Christchurch New Zealand

□ I understand that all data collected for the study will be kept in locked and secure facilities and/or in password protected electronic form and will be destroyed after 5 years.

□ I understand the risks associated with taking part and how they will be managed.

□ I understand that I am able to receive a report on the findings of the study by contacting the researcher at the conclusion of the project.

□ I understand that I can contact the researcher Losana Vao Latu Latu at sanavao.leo@gmail.com or supervisors; Professor Jennifer Brown (jennifer.brown@canterbury.ac.nz) or Dr. Jacki Henderson (jacki.henderson@canterbury.ac.nz) for further information. If I have any complaints, I can contact the Chair of the University of Canterbury Educational Research Human Ethics Committee, Private Bag 4800, Christchurch (humanethics@canterbury.ac.nz)

□ I would like a summary of the results of the project.

□ By signing below, I agree for ……(name of the child) to participate in this research project.

Name: …… Signed:…… Date:……

Email address (for report of findings, if applicable): ……

Please after completion of the consent form, seal it in the envelope(will be provided) then address it to the principal and drop to the school main office (if possible) or send them with your child the next day.

Malo 'aupito.
Losana Vao Latu Latu

TONGAN VERSION OF INFORMATION SHEET

Mathematics and Statistics Department

Telephone : +64302102313804
Date : 22/05/2017

Fa'unga 'o e famili mo e ola fakaako 'a e fanau ako 'i he ngaahi ako ma'uloungа 'i Tonga

Ko e fakafehoanaki 'a e ola fakaako 'etau fanauako 'i he ngahi ako maolunga 'i he vaha'a 'o e fa'unga famili 'oku kakato pea mo e fa'unga famili 'oku 'ikai kakato

Ngaahi Fakamatala ki he matu'a tauhi fanau

Malo e Lelei

Ko hoku hingoa ko Losana Vao Latu Latu pea oku fakahoko 'eku fekumi ki hoku mata'itohi MA 'i he Univesiti 'o Canterbury. 'Oku ou 'i Tonga ni ke fai 'eku fakatotolo ki he kaunga e fa'unga 'o e famili ki he ola fakaako 'a e fanau'ako he ngaahi ako malonga 'i he vaha'a 'o e ta'u 13-18 'i Tonga ni.

Ko e ki'i fakamatala nounou ki he fekumi 'oku 'amanaki fakahoko

Taumu'a

Ke fekumi ki he fe kainga'aki 'o e faunga 'o e famili pea mo e ola 'o e ako 'a e fanauako 'i ngaahi ngaahi ako ma'olunga 'i Tonga

Taumu'a nounou

Ke fekumi pe 'oku' iai ha faikehekehe he 'i he ola 'o e ako 'a e fanau mei he Famili 'oku kakato hono fa'unga pea mo e ngaahi famili 'oku 'ikai kakato hono fa'unga

Fakamatala'i:

Famili 'oku kakato hono faunga: - Ko ha famili 'oku kakato hono faunga 'oku iai 'a e tamai pea mo e fa'e pe ko e fanau 'oku pusi'aki'i ki he famili 'oku iai e tamai pea mo e fa'e

Famili 'oku 'ikai kakato hono fa'unga: - Ko e famili 'oku 'ikai kakato hono fa'unga 'oku iai pe tamai pe koe fa'e pe 'oku pusiaki'i ki ha famili ko e tamai pep e fa'e pe 'oku nofo pe ha kainga pea ko ha kaungame'a pe 'o e ongomatu'a pe 'oku 'ikai 'iai ha matu'a

Mahu'inga 'o e ako ko'eni

Ko e sosaieti Tonga 'oku nau vivili ke fakalaka 'a e ako 'a 'enau fanau.Ke 'iai ha faitu'utu'uni lelei pea ko ha palani ke tokoni'i 'o e fanau kuo pau ke 'iai ha fakamo'oni fe'unga ke makatu'unga ai e tokoni.Ko e taumu'a 'o e ki'i fekumi ko'eni ke 'oange ki he kau fakalele ako 'o Tonga,kau tauhi fanau pea pehe ki he pule'anga ha tokoni ki ha faunga famili 'e fakalaka ai a e lavame'a mo e ola e ako 'etau fanau.

Kapau te ke loto ke kau ho'o ki'i tamasi'i he fekumi mo e ako ko'eni pea teu faka'eke'eke ia hili hano fakahoko 'atu kiate koe ki mu'a 'i he' aho 'o e faka'eke'eke ai.Ko e ngaahi me'a 'e fai ai 'a e faka'eke'eke ko e fa'unga 'o e famili,ko e kau a e matu'a he feinga 'a e fanau,tu'unga fakapa'anga, ko 'ene tu'i fakalotu, ko e taimi 'oku fakamoleki ke fai ai 'ene ako 'i api,ko e faka'amu 'a e famili mo 'ene faka'amu kiate ia.Ko e faka'eke'eke 'e lekooti ia he tepi he meimei he miniti e 10.Kapau leva 'oku iai ha mou fehu'i pea ke ta mai pe ki he Fika koe 8822779 pe ko ho tohi mai ki he email ko'ena ; sanavao.leo@gmail.com. 'I hono muimui 'i 'o e fakatotolo kuo u kole atu ke ke angalelei mu'a kae 'omai mu'a ho'o fika telefoni pe ko ho email keu fetu'utaki atu ai.

Ko e palopalema 'e fetaulaki mo ho'o ki'i tamasi'i pe ta'ahine I he ki'i fakatotolo ko'eni he te ne fetaulaki mo e ngaahi fehu'i ki he moui ho famili ka 'oku ou fakahoko atu pe 'oku iai pe 'ene totonu ke 'oua te ne tali 'a e fehu'i koia pe ko ha fa'ahinga fehu'i 'oku 'ikai loto ia ke ne tali.Ko e faka'eke'eke kapau 'oku ne loto ke 'iai ha faiako,Tiuta Lahi pe Puleako he faka'eke'eke 'oku faka'ofo'ofa aupito.

Ko e kau ki he fekumi ko'eni 'oku fai pe ki ho loto kiai pea kapau 'oku loto ho ki'I tamasi'i pe ta'ahine ke 'ikai to e kau ia ki he poloseki ko'eni pea 'oku 'ikai 'iai ha tautea.Kapau 'e loto ke 'ikai to e kau he fekumi ko'eni pea teu to'o aupito 'a e ngaahi fakamatala 'oku kau kiai.

Ko e ola 'o e fekumi ko'eni hiki ia ki ha tohi pea 'oku ou fakapapau'i atu heni ko e ngaahi fakamatala kotoa pe pea mo e hingoa he'ikai hiki ia he tohi.Ko e ngaahi fakamatala kotoa pe 'e tanaki 'e tauhi ia he Komipiuta

(server) fakatotolo 'a e Fika mo e Setisitika 'a e Univesiti 'o Canterbury. He'ikai iai ha taha e 'ilo ki he ngaahi fakamatala ko'eni ngata pe 'i he supervisor pea mo au. Ko e ola 'o e fekumi ko'eni he hiki ia pea 'e ma'u mei he laipeli 'a e Univesiti 'o Canterbury

Ko e fekumi ko'eni koe fiema'u ia ki si'oku Master he Saianisi pea oku fakamalumalu 'a e fekumi ko'eni 'i he Palofesa ko Jennifer Brown pea mo e Toketa ko Dr. Jacki Henderson pea te ke lava pe 'o fetu'utaki kiai he email ko'ena ko ejennifer.brown@canterbury.ac.nz pe jacki.henderson@canterbury.ac.nz . Te na loto lelei pe ke fakatalanoa atu ki he fekumi ko'eni pea mo e founga 'e kau ai ho'o tamasi'i pe ta'ahine ki he fekumi ko'eni.Ko e fekumi ko'eni na'e fakangofua ia he Va'a fekumi a e Univesiti 'o Canterbury .Kapau 'oku iai ha'o launga pea ke fetu'utaki pe ki sea o e, Educational Research Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch: humanethics@canterbury.ac.nz.

Kapau te ke loto ke kau ho'o tamasi'i pe ta'ahine he fekumi ko'eni pea ke kataki ka ke fakafonu mai a e ki'i foomu 'oku ke tali lelei 'a e fiema'u ko'eni.Fakatauange te ke tali lelei a e fakatangi ni ke fakakakato 'a e fekumi ko'eni ki he lelei 'a e ako hotau fonua ko TONGA.

Malo 'aupito

Losana Vao latu Latu

TONGAN VERSION OF THE CONSENT FORM

Mathematics and Statistics Department
Telephone : +64302102313804
Date : 19/04/2017

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Fa'unga 'o e famili mo e ola fakaako 'a e fanau ako 'i he ngaahi ako ma'ulounga 'i Tonga

Ko e fakafehoanaki 'a e ola fakaako 'etau fanauako 'i he ngahi ako maolunga 'i he vaha'a 'o e fa'unga famili 'oku kakato pea mo e fa'unga famili 'oku 'ikai kakato

Foomu ke fakafonu mai 'ehe matu'a

Kataki 'o faka'ilonga'i ☑ e ngaahi puha kapau 'oku mahino kiate koe pea ke loto ki ai.

☐ Kuo 'osi fakamatala'i kiate au 'a e fekumi ko'eni pea 'oku faingamalie ke fakaeke'eke 'eku tama.

☐ Kuo u mahino'i 'a e me'a'oku fiema'u mei hoku foha/ofefine pea kuo u loto ke kau atu ki he fekumi ko'eni .

☐ Kuou mahino'i ko e kau ki he fekumi ko'eni 'oku makatu'unga pe he'eku loto kiai pea ko hoku foha/ofefine 'e lava pe ke malolo mei he fekumi ko'eni ha fa'ahinga taimi pe 'o 'ikai iai ha tautea.Ko 'ene malolo 'oku 'uhinga ia e to'o ai pe mo e ngaahi fakamatala 'oku kaunga kiai pea 'oku malava pe

☐ 'Oku ou mahino'i pe ko e ngaahi fakamatala mo e fakakaukakau 'o 'eku tama e matu'aki malui ia ke malu ki he tokotaha fakatotolo pe mo 'ene supervisor. Pea ka iai ha me'a 'e hiki tohi pe lipooti ko e hingoa 'o 'eku tama mo e apiako he 'ikai fakaha.Kuou ilo'i ko e fakatotolo ko eni ko e ngaahi koloa 'a e fonua pea 'e mau ai mei he laipeli 'a e Univesiti 'o Canterbury.

☐ Kuou 'ilo'i ko e ngaahi fika mo e fakamatala 'ihe fakatotolo ko'eni 'etauhi malu ia 'i he ngaahi komipiuta kuo loka malu pea 'e toki fakaauha ia hili ha tau 'e 5

☐ Kuou 'iloi pe a e mea 'e uesia he fakatotolo ko'eni.

☐ Kuou 'iloi pe ka iai ha me'a 'oku ou fie 'ilo ki he fakatotolo ko'eni teu fetu'utaki pe ki he tokotaha fakatotolo

☐ kuou ilo'I teu fetu'utaki ki he tokotaha fakatotolo ko Losana Vao Latu Latu at sanavao.leo@gmail.com pe ko e supervisors; Professor Jennifer Brown (jennifer.brown@canterbury.ac.nz) pe ko Dr. Jacki Henderson (jacki.henderson@canterbury.ac.nz) ki ha to e tokoni. Kapau 'e iai ha launga pea teu fetu'utaki ki he sea oe va'a fekumi a e Univesiti o Canterbury, Private Bag 4800, Christchurch (humanethics@canterbury.ac.nz)

☐ Kuou fiemau 'a e fakalukufua 'o e ola 'o e fekumi ni.

Fakamo'oni 'i lalo 'oku ou loto, ……(Hingoa ho'o foha / 'ofefine) ke kau he fekumi koeni.

Hingoa: ..... Fakamooni: ..... 'Aho: .....

Ko ho email (ki he lipooti ka 'oku iai ha'o email,): .....

Fakamolemole ka lava ho'o fakamo'oni pea ke sila'i pe 'a foomu he sila 'o 'oange ki ho'o tamasi'i/ta'ahine ke ha'u mo ia pe ko hono fakafoki mai pe ki he 'Ofisi .

Malo 'aupito.
Losana Vao Latu Latu

STUDENTS' INFORMATION SHEET

Mathematics and Statistics Department
Telephone : +64302102313804
Date : 12/04/2017

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Family structure and academic achievements of high school students in Tonga.

A comparative study of academic achievements of high school students from traditional families and those from non-traditional families.

Information sheet for each participant

Malo e Lelei

I am Losana Vao Latu Latu, a Master student at the University of Canterbury. I am here undertaking a research on the possible link between family structure and academic achievement of high school students age 13 to 18.

Brief description of the study

Purpose

To quantify the link between family structure and academic achievements of high school students in Tonga.

Objective

To identify whether there is a significance difference in the academic achievements of high school students from a traditional family and those from a non-traditional family.

Definition:

Traditional family: - family made up of a married biological parents or married adoptive parents

Non – Traditional family: - family made up of a single parent (by birth(solo), divorce, death), unmarried biological parents or unmarried adoptive parents, staying with relatives /friends(no parents)

Importance of the study

Everyone wants improvement in the academic achievements of their children. For effective decision making and intervention planning, guidelines based on solid evidences must be in place. The intention of this study is to assist in providing guidelines for school administrators, parents and Government by identifying effective support for family structure that will improve academic achievements.

If you choose to take part in this study, you will be informed for the time of the interview. The interview will be conducted here at school. A script of questions will be given to you beforehand so that you will

be prepared for what to say during the interview. The interview will be audio recorded and it will take at most 10 minutes. The recording will be done by myself and it will be kept locked in a cabinet and will be destroyed after transcribing. As a follow-up to this investigation, you will be asked to provide your phone number and email address.

The risks of participating in this study may be some sensitive questions will be asked, however I want you to understand that you have every right to refuse to answer any questions that you do not wish to answer. If you feel uncomfortable or distress to be interviewed alone, you can choose someone to accompany you during the interview (either, one of your parents, principal, senior tutor/mistress or anyone you prefer).

Participation is voluntary and you have the right to withdraw from the project at any time without penalty.

If you choose to withdraw, I will use my best endeavours to remove any of the information relating to you from the project, including any final publication, provided that this remains practically achievable.

The results of the project may be published, but you may be assured of the complete confidentiality of data gathered in this investigation: your identity will not be made public without your prior consent. To ensure anonymity and confidentiality, all data will be stored on a secure research server within the School of Mathematics and Statistics. No identifiable information will be stored on the server, such as names, and instead anonymous ID's will be used. No one will access to the data except me and my supervisors. The data will be destroyed after 5 years from now. For your information a thesis is a public document and will be available through the University of Canterbury Library in Christchurch New Zealand.

The project is being carried out as a requirement for a Master Thesis in Science by Losana Vao Latu Latu under the supervision of Professor Jennifer Brown and Dr. Jacki Henderson, who can be contacted at jennifer.brown@canterbury.ac.nz and jacki.henderson@canterbury.ac.nz . They will be pleased to discuss any concern you may have about participation in the project.

This project has been reviewed and approved by the University of Canterbury Educational Research Human Ethics Committee, and participants should address any complaints to The Chair, Educational Research Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch: humanethics@canterbury.ac.nz.

If you agree to participate in the study, you are asked to complete the consent form and return it to the principal or deputy principal anytime today.

Malo 'aupito

Losana Vao latu Latu

STUDENTS' CONSENT FORM

Mathematics and Statistics Department
Telephone : +64302102313804
Date : 12/04/2017

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Family structure and academic achievements of high school students in Tonga.

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Consent form for each participant

Please place a tick ☑ inside the appropriate boxes

□ I have been given a full explanation of this project and have had the opportunity to ask questions.

□ I understand what is required of me if I agree to take part in the research.

□ I understand that participation is voluntary and I may withdraw at any time without penalty. Withdrawal of participation will also include the withdrawal of any information I have provided should this remain practically achievable.

□ I understand that any information or opinions I provide will be kept confidential to the researcher and her supervisors and that any published or reported results will not identify the participants or their schools. I understand that a thesis is a public document and will be available through the UC Library

□ I understand that all data collected for the study will be kept in locked and secure facilities and/or in password protected electronic form and will be destroyed after 5 years.

□ I understand the risks associated with taking part and how they will be managed.

□ I understand that I am able to receive a report on the findings of the study by contacting the researcher at the conclusion of the project.

□ I understand that I can contact the researcher Losana Vao Latu Latu at sanavao.leo@gmail.com or supervisors;

Professor Jennifer Brown (jennifer.brown@canterbury.ac.nz) or Dr. Jacki Henderson (jacki.henderson@canterbury.ac.nz) for further information. If I have any complaints, I can contact the Chair of the

University of Canterbury Educational Research Human Ethics Committee, Private Bag 4800, Christchurch (humanethics@canterbury.ac.nz)

□ I would like a summary of the results of the project.

□ By signing below, I agree to participate in this research project.

Name: ..... Signed: ..... Date: .....

Email address (for report of findings, if applicable): .....

Please after completion of the consent form, take it to the principal or deputy principal.

Malo 'aupito.
Losana Vao Latu Latu